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DIVISION OF SANITARY REPORTS AND STATISTICS

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 JANUARY 3, 1936 NO. 1

THE TYPHOID CONTROL PROGRAM AND RESULTS OF 13 YEARS' WORK IN WILLIAMSON COUNTY, TENNESSEE, 1922-35 [1]

By W. C. WILLIAMS,[2] M. D., C. P. H., and E. L. BISHOP,[3] M. D., C. P. H.

In spite of active control measures, typhoid fever still remains a rural problem of public health importance, particularly in the Southern States. Although the mode of spread of typhoid has been known for many years, comparatively little has been done toward thorough investigation and control of endemic cases that so frequently occur in rural sections. Immunization and sanitation campaigns by State and local health agencies have resulted in a marked reduction in the number of typhoid cases; yet there are comparatively few accurate data available showing the relative value of the several measures employed in a rural typhoid-control program. As a consequence, it was felt that an analysis of the Williamson County program which has been conducted over a 13-year period might afford an excellent opportunity to appraise the value of, first, immunization and case control, and, second, immunization and case control plus a general sanitation and educational program. During the latter part of the program (1930–35), some consideration was given investigation to determine the actual source of case infection and toward more adequate case control measures, the efforts and activities of the entire county health department personnel being routinely utilized in some phase of this study, which was made possible through a supplementary grant by the Rockefeller Foundation and advisory assistance by Dr. George H. Ramsey, of Johns Hopkins School of Hygiene and Public Health.

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[1] Read before the Southern Section, American Public Health Association, San Antonio, Tex., November 15, 1934 Revised to include more recent data.

[2] Commissioner, Tennessee State Health Department, Nashville, Tenn , 1935, director local health service, Tennessee State Health Department, 1934-35, director Williamson County Health Department, Franklin, Tenn , 1926-34

[3] Director, Health and Medical Section, Tennessee Valley Authority, Knoxville, Tenn., 1935; Commissioner, Tennessee State Health Department, Nashville, Tenn., 1924-35.

GENERAL CONSIDERATIONS

Williamson County is not unlike the average rural county of Tennessee. The population of 22,845 is composed of 77 percent white and 23 percent Negro. Approximately 14 percent of the total population is classified as urban and lives in Franklin, the county seat and only incorporated town of the area. The residential and racial classifications varied but little during the period. Agriculture is the chief means of livelihood, with dairying being a year-round source of income. The three small industrial plants in the county employ less than 300 persons, and there are no industrial communities. The general economic status of the area should probably be classed as above-average when compared with the rural South as a whole.

There had been no outbreak of communicable disease in the county during recent years that would likely be confused with typhoid fever, the diseases reported varying very little from the morbidity reports from other sections of the State. Malaria was not a problem, although during recent years there has been an increasing number of cases of apparent extracounty origin. Diarrheas and other enteric conditions were prevalent largely during the warmer months, but were of no unusual incidence or severity. Endemic typhus, Rocky Mountain spotted fever (eastern type), undulant fever, and tularaemia were reported and diagnoses confirmed between 1928 and 1935. The average annual tuberculosis death rate during the past 5-year period was slightly in excess of 100 per 100,000 population; two reported typhoid suspects occurring since 1928, both of which terminated fatally, were confirmed cases of acute miliary tuberculosis. Thus, it is evident that the available diagnostic facilities were reasonably adequate and efficient.

A full-time health department was organized in October 1921 and has functioned continuously since that date. The initial personnel consisted of a health officer, nurse, and clerk. A sanitation officer was added in 1923, an additional nurse in 1928, and an assistant health officer and two additional nurses in 1930, the latter group being added directly as a result of special Rockefeller Foundation grant and an increased local appropriation in order that the area might be used for epidemiological research and the training of field personnel.

The purpose and plan of the study as originally begun were as follows:

(1) Determination of the actual prevalence, past and current, of typhoid fever in Williamson County, a rural Tennessee county, and a comparison with adjacent counties, both with and without full-time health service.

(2) Investigation and development of methods for the administrative management of cases and carriers, as well as a means for the control and elimination of other infective foci.

(3) Investigation of the relative value of (*a*) the case-handling procedure, (*b*) the immunization program, (*c*) the general sanitation program, and (*d*) carrier-control measures.

Unusual research opportunities are ever present in county health department field activities, and it was felt that a part of the effort expended in these activities could be and should be devoted to the systematic and cumulative collection of valuable data without materially interfering with the general program. This apparent fact does not seem to be recognized by the average county health officer, even though such a practice does much toward eliminating the monotony of a routine field program and offers an excellent opportunity for ambitious individuals to develop personnel initiative and coordination of interdepartmental effort. Any procedure undertaken should be under the direct supervision of the department director, but not necessarily restricted to the efforts of that individual or any particular member of the department staff. As in this study, every member of the staff from clerk to director can make a valuable contribution in one way or another without interfering in the least with the regular routine program.

GENERAL FINDINGS

PREVALENCE OF TYPHOID FEVER, 1916–35

Available reports clearly indicate that typhoid fever appeared as a serious endemic disease that had assumed epidemic proportions at times in the past.

Table 1 was prepared from official State and local records.

TABLE 1.—*Reported cases and deaths and case and death rates from typhoid fever, Williamson County, Tenn., Jan. 1, 1916–Oct. 1, 1935*

Year	Cases	Case rate [1]	Deaths	Death rate [1]
1916–21	[2] 61 7	262 9	[2] 6 8	29 1
1922	59	253 3	3	12 9
1923	34	146 3	0	0
1924	10	43 1	2	8.6
1925	31	134 0	2	8 6
1926	34	147 4	2	8.6
1927	14	60 8	2	8 7
1928	19	82 9	2	8.7
1929	13	56 6	1	4 3
1930	9	39 4	1	4 3
1931	3	13 1	0	0
1932	7	30 5	0	0
1933	3	13 1	0	0
1934	1	4 4	0	0
1935	1	4 4	0	0

[1] Per 100,000 population
[2] Mean annual number

Table 1 indicates that, while the occurrence of cases has been somewhat irregular, there has been a marked decline in both morbidity and mortality from typhoid fever during recent years. The decline apparently began soon after the establishment of full-time health service and appears to be more pronounced during the two periods 1923–28 and 1929–35. There is no reason to believe there had been any change in the causative organism. The change of population characteristics as to color and residence was relatively insignificant; and unless the decline was a part of a general State-wide decline in typhoid morbidity and mortality, presumably it must have been related in

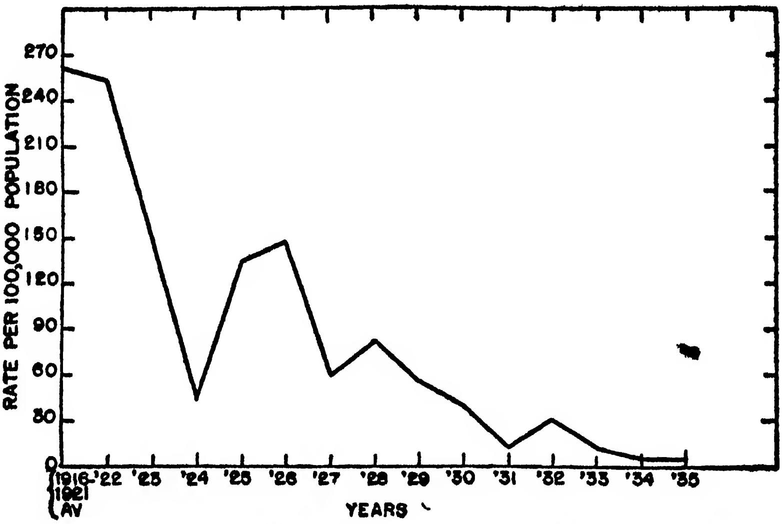

FIGURE 1.—Typhoid fever case rates, Williamson County, Tenn., Jan 1, 1916–Oct. 1, 1935.

some way to the activities of the county health department or other agencies within the area.

It is also observed that the reporting of cases during recent years, certainly since 1928, has been relatively complete, because of the increased interest of private physicians as a result of an improved diagnostic procedure; also because of increased field activity by the health department. An attempt will be made to correlate these observations with certain phases of the program to be described in a subsequent section of this article.

CASE-HANDLING PROCEDURE

The department files contained only 32 case records for the 67 cases reported during the years 1926–28, inclusive. The available records were rather incomplete and gave no leads regarding the possible source of infection except where there was a known history of direct contact.

Hence, had the other records been available, in all probability they would have been valueless. No carriers were recorded or listed as having been under supervision prior to 1930. The routine case service prior to 1928 usually consisted of an initial visit by the health officer for diagnosis and general instructions regarding concurrent disinfection with the number of subsequent visits being largely determined by the case or community problem, also, by the exigencies of the general program.

Beginning in 1928, the nursing service was given some case-handling responsibility—an effort was made to have cases visited once each week with a careful check being made on means of concur-

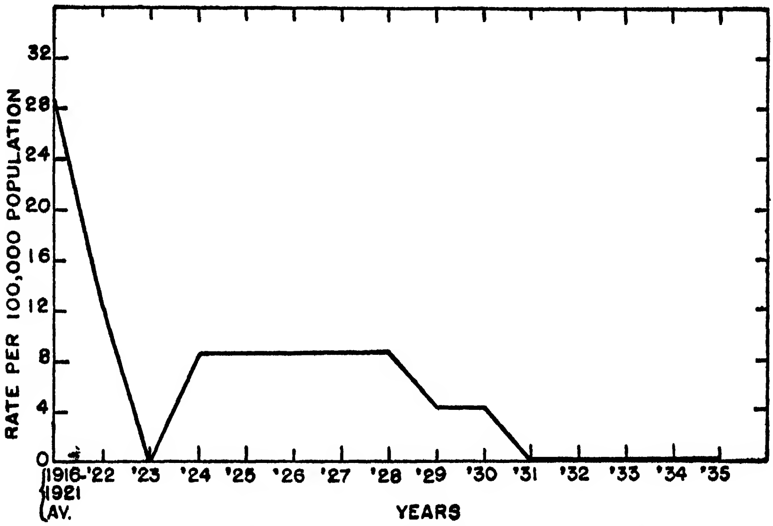

FIGURE 2.—Typhoid fever death rates, Williamson County, Tenn., Jan. 1, 1916–Oct. 1, 1935.

rent disinfection, care of patient, also demonstrations and other services performed as indicated.

In 1930 the sanitation inspector was assigned the responsibility of getting an approved excreta-disposal system and water-supply system installed in the home immediately after a case or suspected case of typhoid fever was reported.

The routine case-handling procedure since July 1930 has been as follows:

(1) After a case has been reported, immediate visit for diagnosis by the health officer, giving general instructions and starting routine epidemiological study, which includes complete case history and outline of investigative procedure, the investigation to include routine collection of urine and feces specimens on all household and suspicious contacts.

(2) Case visited within 24 hours by nurse, who gives more specific instructions and demonstrates bedside nursing care and concurrent disinfection. The nurse also begins the organization of the immunization clinic to be conducted by the health officer. Nursing visits are routinely made each week until convalescence.

(3) The sanitation officer usually starts efforts toward improved sanitation within 48 hours after the case is reported (the health officer having previously advised the family that both the nurse and sanitation officer would visit them in the interest of their respective types of service).

(4) All personnel make routine community inquiry for suspected typhoid cases. All suspects found are immediately called to the attention of the health officer, who makes the necessary contacts with the physician in charge or investigates as needed.

An analysis of the annual reports shows that there have been no known or suspected typhoid epidemics attributable to the town of Franklin water supply (the city survey of 1927 shows that 83 percent of the population of Franklin used the city water supply). The 1926 report reveals that there was a questionable milk-borne epidemic in Franklin during the early summer, but that the suspected source of infection was never verified bacteriologically. An analysis of the case records reveals that lack of immunization, insanitary excreta-disposal system, and lack of screening were constant findings in all homes where cases occurred.

For comparative purposes, table 2 has been prepared to show the mortality rates and case-fatality rates in Williamson County, counties immediately adjacent to Williamson, and the State of Tennessee.

TABLE 2.—*Mean annual mortality rates and case-fatality percentages for typhoid fever, Williamson County, counties adjacent to Williamson, and the State of Tennessee, by 5-year periods, 1916–34, inclusive*

County	Mean annual mortality rates per 100,000 population				Mean annual case-fatality percentages			
	1916–20	1921–25	1926–30	1931–34	1916–20	1921–25	1926–30	1931–34
Maury [1]	42.8	24.0	23.3	14.7	46.7	25.9	16.0	27.3
Hickman	22.1	29.7	24.1	17.1			20.5	41.2
Rutherford [2]	24.8	24.4	24.0	13.4	([3])	35.3	23.2	19.7
Davidson [4]	17.6	14.8	4.9	3.0	12.3	18.6	26.2	30.4
Cheatham	45.4	10.3	13.0	18.5	7.5	4.2	13.3	12.5
Dickson	17.5	24.1	23.6	5.4			22.9	10.3
Williamson [5]	24.6	16.4	6.9	0.0	10.6	8.8	9.1	0.0
Tennessee	29.2	23.5	16.6	10.3	31.9	35.0	17.6	15.9

[1] Health service organised 1931.
[2] Health service organized 1924.
[3] Statistics not accurate.
[4] Health service organized 1920.
[5] Health service organized 1921.

An analysis of the case fatality rates seems to indicate better and more uniform reporting in Williamson County than in the surrounding areas; and based on that deduction, it is seemingly apparent that

more consistent reduction in typhoid mortality has occurred in Williamson County than in neighboring counties and in the State as a whole. It seems logical to assume that this consistent decrease in mortality perhaps was not due to lessened virulence of the organism or to other more or less general causes.

Table 3 shows the distribution of deaths, urban and rural, with rates for each group.

TABLE 3.—*Typhoid fever mortality rates, urban* [1] *and rural classification, per 100,000 population, Williamson County, Tenn., 1916–35*

Period	Rural		Urban [1]	
	Recorded deaths	Mean annual death rate	Recorded deaths	Mean annual death rate
1916–20	21	21.8	8	38.3
1921–25	15	15.8	4	18.6
1926–30	8	8.7	1	4.6
1931–35	0	0	0	0

[1] Includes town of Franklin and Ninth Civil District, which is immediately adjacent thereto

Similarly, as in reports of other prevalence studies in the smaller municipalities, the morbidity and mortality rates have shown the

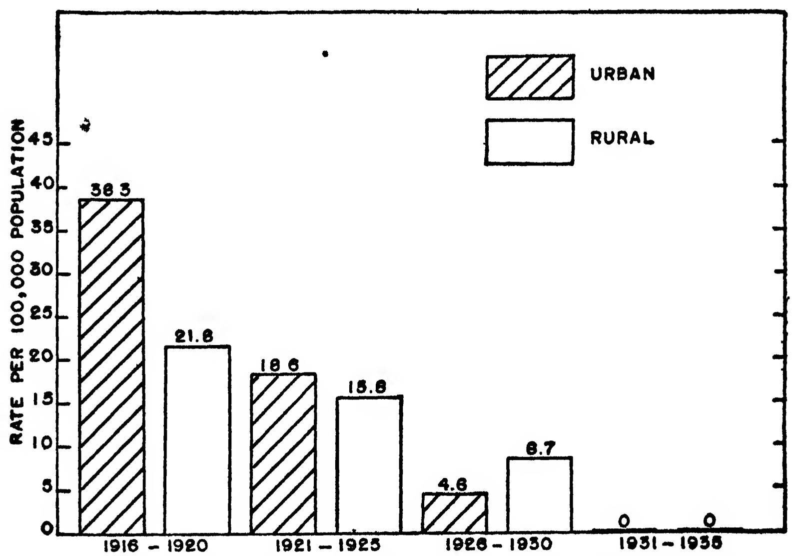

FIGURE 3.—Mean annual typhoid fever mortality rates (5-year grouping), urban and rural populations, Williamson County, Tenn., 1916–1935, inclusive.

greatest decline in Franklin, the only urban area of the region. The unsewered section of Franklin had a relatively large number of sanitary privies installed in 1926, and an intensive sanitation cam-

paign was waged in 1928, when more than 90 percent of the unsewered homes had an approved means of excreta disposal installed. During this period many surface wells were condemned and many connections made to the city water supply. The rural sanitation work was not started until about the middle of 1928.

Table 4 compares case and death rates in the white and Negro groups.

TABLE 4.—*Mean annual morbidity and mortality rates, white and Negro, per 100,000 population, Williamson County, Tenn., 1916–35*

Period	Mean annual case rate		Mean annual death rate	
	White	Negro	White	Negro
1916–20	257.8	171.0	22.7	29.5
1921–25	207.3	171.9	12.9	25.6
1926–30	82.6	57.9	5.7	10.8
1931–35	13.1	23.7	0	0

Table 4 indicates that the greatest decline in case and death rates in the Negro group occurred during the 1926–30 period, which included the two clean-up campaigns in Franklin and thickly populated

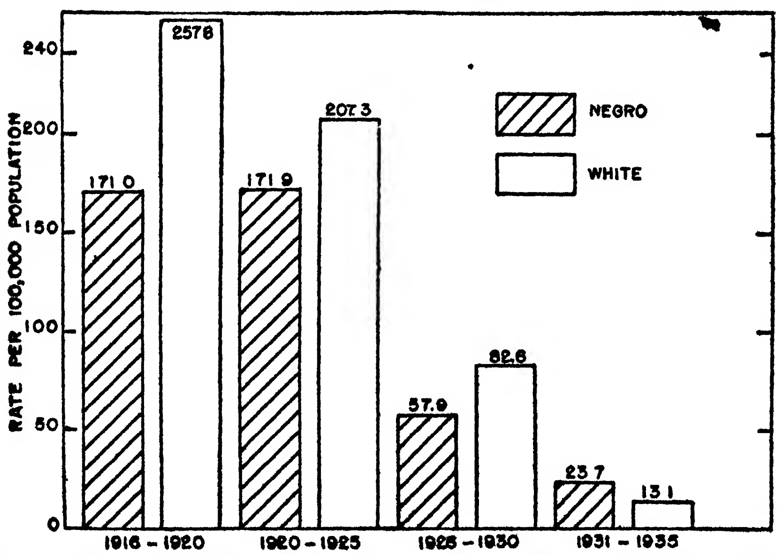

FIGURE 4.—Mean annual typhoid fever morbidity rates (5-year grouping), white and Negro populations, Williamson County, Tenn., 1916–1935, inclusive.

communities; an intensive inoculation campaign was also conducted among the Negro group during this period. The greatest decline in the white group occurred during the past 4-year period, when the county-wide sanitation program reached the rural area.

TYPHOID IMMUNIZATION

Shortly after the establishment of the health department in 1921, and before any immunization clinics were organized, the Williamson County Medical Society approved the organization and conduct of these clinics throughout the entire county. As a general rule, clinics were held in all schools of the county during the school year, by the health department, with additional clinics being held during the summer months at the various country stores and community centers. All persons desiring the immunization were advised that it should

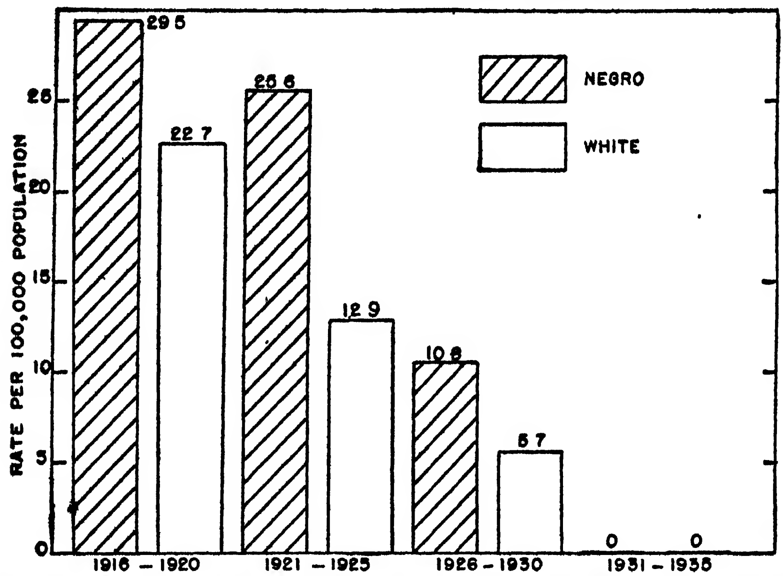

FIGURE 5.—Mean annual typhoid fever mortality rates (5-year grouping), white and Negro populations, Williamson County, Tenn., 1916–1935, inclusive.

be repeated at least every third year and more often in the presence of a case in the home or an increasing number of cases in the community. Immunization clinics were routinely organized as a part of the case-handling procedure.

The vaccine used was prepared from Rawling's strain of *B. typhosus*, Owens' strain of *B. para typhosus A*, and Schottmüller or Kessle's strain of *B. para typhosus B*.

An effort was made to reach the population between 3 and 40 years of age, with vaccine being given the group under 3 years only in the presence of a case in the family.

The number of typhoid immunizations (3-dose) completed by the health department staff by calendar years from 1921 to September 30, 1935, inclusive, is shown in table 5.

TABLE 5.—*Immunizations completed, 1921–35, inclusive*

Year	Completed immunizations
1921	4
1922	2,265
1923	1,194
1924	1,852
1925	1,936
1926	1,962
1927	3,081
1928	2,197
1929	3,759
1930	3,534
1931	3,551
1932	3,918
1933	3,921
1934	3,261
1935	3,557
Total	39,992

It is apparent from table 5 that typhoid vaccine was given to 21,742 persons during the 6-year period, 1930-35 (Oct. 1), inclusive, including "repeaters." Typhoid vaccine was available to private physicians upon request. The number of immunizations completed by private physicians is unknown.

Since 1929, effort was made to prevent the annual "repeater"; and unless expressedly desired or indicated, the vaccine was given only at 3-year intervals.

TABLE 6.—*Classification of immunizations by persons receiving one or more series 1927–33*

Year	Series 1	Series 2	Series 3 or more	Total, all series
1927	2,507	0	0	2,507
1928	1,931	216	0	2,147
1929	2,773	469	38	3,280
1930	2,111	757	213	3,081
1931	2,069	1,001	536	3,606
1932	1,640	1,106	382	3,128
1933	1,896	1,202	310	3,408
Total	14,927	4,751	1,479	21,157

A check of the individual record cards of the 23,961 inoculations completed during the period 1927–33, inclusive, revealed 21,157 individual cards that could be tabulated. Table 6 shows that at least 10,489 different persons, or approximately 46 percent of the total county population, completed at least one series of typhoid prophylaxis during the 5-year period, 1929–33. Of this group, 8,914 were between 5 and 40 years of age. The United States Census Bureau figures of 1930 show that 61 percent of the total county population, or 13,935 persons, were classed in this age group; hence, approximately 64 percent of the so-called "typhoid age group" received prophylatic immunization during the period. It is of some interest to observe

that in the first civil district, which contains approximately 10 percent of the total county population, and in which the individual immunization file shows that 87.4 percent of the total population had received at least one series of typhoid vaccine during the period 1927–31, inclusive, typhoid fever had been practically eliminated without control measures other than the routine case handling, no general sanitation program having been carried on in this area during the above-mentioned period, excepting that incidental to the case-control policies.

Although 41.5 percent of the total population of civil districts 18 and 20 had received at least one series of typhoid vaccine, an average of 6 to 8 cases of typhoid fever occurred each year, with no appreciable decline in the morbidity rate until in 1929, at which time the two rural villages in this area were cleaned up. Following the sanitation program, in which approximately 85 percent of the homes had an approved means of excreta disposal installed, typhoid fever practically disappeared. Only 2 cases have been reported in these districts since June 1929, 1 being in a nonresident laborer, the other in a native of the larger unincorporated village.

TYPHOID FEVER IN VACCINATED INDIVIDUALS

In analyzing the 85 cases reported from 26 counties as occurring in individuals who had previously received one or more complete typhoid immunization series within 36 months prior to onset of illness, it was found that 72 of these had received one complete series (3-dose); 12, two series; and 1, three series. There were also reported 19 cases in persons who had an incomplete immunization series for the corresponding period. Among this group of 85 cases in individuals who had received one or more series there were 6 deaths, or a case fatality rate of 7 percent. Complete records from five representative counties of the group for the corresponding years in which cases were reported in the immunized group show there were 106 cases in the nonimmunized group, with 15 deaths, or a case-fatality rate of 14.2 percent.

GENERAL SANITATION

In reporting premises made sanitary, it is usually implied that a safe water supply as well as an improved excreta-disposal system has been provided, this being the rule with reference to urban homes; but in the rural home the condition of the water supply remained unchanged in most instances. An analysis of the department records shows that the following number of rural and urban homes had an approved means of excreta disposal installed between January 1, 1927, and September 30, 1935:

TABLE 7.—*Approved excreta disposal facilities installed, urban and rural, in Williamson County, 1927–35,[1] inclusive*

Year	Urban	Rural
1927	93	24
1928	94	340
1929	79	765
1930	72	597
1931	13	355
1932	5	95
1933	0	129
1934	48	319
1935	0	298
Total	404	2,922

[1] Through September 1935.

The urban premises shown in table 7 include those in which major repairs had to be made or an approved type of privy installed, as the greater part of the urban sanitation work had been done prior to 1927. The 1927 survey of the town of Franklin showed that 55 percent of the homes were connected with city sewer, septic tank, or cesspool, the remaining 45 percent having what was once an approved type of privy or the usual insanitary privy. The survey also shows that 82.5 percent of the homes were connected with the city water supply system, with the other 17.5 percent receiving their water from wells, cisterns, or springs. With reference to rural sanitation work, very little had been done prior to 1928; and as there was no established maintenance program, it is reasonable to assume that the percentage of rural population served by improved excreta-disposal systems was relatively small. According to the 1930 census, there were approximately 4,000 rural homes in the county. Hence, from the above table, it is evident that 73.0 percent of the rural homes had an approved excreta-disposal system installed between January 1927 and October 1935. The greater portion of this work came after February 1928, when county-wide regulations governing excreta disposal were adopted. In the beginning of the general sanitation program, effort was first directed toward cleaning up the urban, suburban, and thickly populated community centers where typhoid fever had been prevalent in the past.

The general sanitation program was one of education rather than one of law enforcement. The first privy to be installed in a given community was usually in the school, in order that all persons interested might have an opportunity to see a life-sized model. That the program of demonstration, education, and persuasion has been successful is shown by the finding of a relatively large number of approved-type privies (for which the department has no record) during the CWA-ERA sanitation program of 1934 and 1935. An analysis of the table also shows that a relatively large amount of

construction was carried on during the depression years, 1930 and 1931. In only three instances was it found necessary to institute legal measures to get the sanitation regulations complied with, this action being taken as a last resort to get compliance with the regulations; also some consideration was given its general effect on the community in which the offender resided.

MILK SANITATION

The passage of the Standard Milk Ordinance by the City Council of Franklin in 1928 decreased the number of dairies selling raw milk in Franklin from 14 to 9; and since that date the number has been reduced to 7. There is no pasteurization plant in the area. Sanitary conditions found during the survey which was made prior to the passage of the ordinance were not unlike those one would expect to find in the voluntarily improved dairy. It is interesting to note that, in the examination of milk handlers, two typhoid carriers were found, one being employed in the dairy suspected during the milk typhoid epidemic of 1926. Many of the so-called "family cow" dairymen were eliminated by the ruling that any person delivering milk was operating a dairy, hence ordinance requirements were to be complied with. It must be admitted that some milk is still being delivered over the backyard fence, but the amount is much less than formerly.

Since 1929, milk samples for bacteriological analysis have been collected at random intervals each month and sanitary inspections made at intervals of 1 to 3 weeks, depending upon the conditions in the individual dairies. Degrading, after due notice of violation of sanitation items had been called to the dairyman's attention, seldom had to be repeated.

Because of the rural character of the area, there was no evidence to indicate such potential vectors as shellfish, ice cream, and green vegetables as important sources of typhoid fever in the county.

HEALTH EDUCATION

In addition to the information and instructions given with reference to case handling and protective measures, seasonal articles dealing with the value of and necessity for the various typhoid-control measures were prepared for the local newspapers. Also seasonal talks, in which the value of immunization and sanitation as typhoid-control measures were outlined, were made before the various community groups and civic organizations, always stressing that immunization was a more or less temporary means of protection whereas sanitation was the one single method for permanent control.

SUMMARY

1. The study was undertaken as part of a routine program of the county health department, with all staff members making a contribution.

2. The first period of decline (1921–25, inclusive) was associated with a generalized and intensive immunization program and an urban sanitation program in the unsewered section of the town of Franklin. There was a reduction of 51.7 percent and 27.5 percent in the urban and rural typhoid fever mortality rates, respectively.

3. The second period of mortality decline (1926–30, inclusive) was associated with a continuation of the immunization and urban sanitation programs and an extension of the sanitation program to suburban Franklin and the more thickly populated community centers throughout the county. This period showed a 75.3-percent decline in the urban and a 44.9-percent decline in the rural rates as compared with those of the preceding period. Compared with the rates of the 5-year period prior to the establishment of the health department, there was a decline of 88 percent for the urban areas and 70 percent for the rural sections.

4. During the last period, 1931–35, during which time the special study was carried on, the cumulative effects of all measures were apparent, since there was no death in either the rural or urban population.

5. The reduction in morbidity and mortality rates was proportionately greater in the white than in the Negro population, and the Negro group showed a higher case fatality rate during the entire period, excepting the latter years (1931–35), in which there were no deaths in either group. The morbidity decrease in the white group was greatest in the period during and immediately following the intensive rural sanitation program.

6. A complete analysis of the immunization status of the population of two civil districts, which constituted 10 percent of the total county population, shows that typhoid fever had practically disappeared during the 5-year period (1927–31), in which 87.4 percent of the total population received at least one series of typhoid vaccine. There was little or no decline in the morbidity rate in another area of similar size in which 41.5 percent of the total population had received at least one series of typhoid vaccine subsequent to June 1929, at which time the sanitation program was completed. Since that date only 2 typhoid fever cases have been reported from this area.

7. A State-wide analysis of the records of typhoid fever in vaccinated individuals shows a case fatality of 7 percent, and in nonvaccinated individuals of 14.2 percent, the vaccinated group having received a complete immunization series within 36 months prior to onset of illness.

8. The passage of the Standard Milk Ordinance and the finding of two typhoid carriers among dairy employees apparently confirmed the suspected source of a mild epidemic (1926) and may have been a contributing factor in the decreased urban rate.

9. The study findings clearly demonstrate the value of and need for accurate case investigation and the recording of all epidemiological information on the individual case record; also, that such a study can be carried on as part of the routine program of the average health department without materially interfering with the general program.

10. An analysis of the 13-year program reveals three successive and distinct periods in which there was a marked reduction in the typhoid morbidity and mortality rates in Williamson County. Since the reduction was proportionately greater than the reduction for surrounding areas without full-time health service and for the State at large, and since it coincided rather closely with the periods in which active and more efficient control measures were instituted and carried on, it logically follows that these measures in all probability were responsible for the declines noted.

CITY SMOKE AND ITS EFFECTS

The following statement[1] was recently prepared by the United States Public Health Service for the hearing on the bills for smoke control in the District of Columbia before the Congressional Subcommittee on Public Health, Hospitals, and Charities and has been printed in the report of the hearings It is reprinted here on account of the interest manifested at the present time in smoke control and smoke prevention.

The losses due to smoke may be classified as follows: Economic losses due to imperfect combustion of fuels; extra expense of cleaning clothes; losses due to disfigurement of residences, office buildings, and factories (repainting, etc.); losses due to soiled merchandise in stores; injuries to grass, shrubs, and trees bordering the streets and in the parks; loss of daylight and ultraviolet light; possible injurious effects on health.

Many estimates have been made of the losses due to these various causes, but the most thorough and consistent are those made by the Mellon Institute of Pittsburgh in 1913.

It was estimated that by the proper stoking of furnaces 21.7 percent of the fuel could be saved,[2] and that the loss due to imperfect combustion in Pittsburgh at that time was $1,520,000 during the year, or a loss for each man, woman, and child, due to incomplete combustion, of about $2.80 per year.

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[1] By James E. Ives, senior physicist, and R. R. Sayers, senior surgeon, U. S. Public Health Service.
[2] O'Connor: Mellon Institute, Smoke Investigation Bulletin No. 4.

O'Connor also estimated that the extra expense, due to smoke, of cleaning clothes, laundry, and dry-cleaning bills in Pittsburgh in 1913 was about $2,250,000, or $4.10 a person.

The estimated expense attributed to the necessity for repairing residences because of soiling by smoke, such as repainting, repapering, and replacing hangings, was $1,240,000, or $2.26 per person per year.

O'Connor reported that, in Pittsburgh in 1913, the estimated loss due to merchandise in the stores being soiled or ruined by smoke was $1,650,000, or a loss of $3 per person per year.

A smoky atmosphere also means loss of daylight and increased lighting bills.

The sum of the losses from the four sources mentioned is $12.16 per person per year. O'Connor estimated that the total loss due to smoke in Pittsburgh during the year 1913 was $10,000,000, or $20 for every man, woman, and child. In surveys made in New York, Chicago, Salt Lake City, Boston, and Baltimore, the economic loss has been estimated at from $10 to more than $30 per person per year.

Besides these losses, which affect the pocketbook directly, the literature on the subject discusses the injury of smoke to plants, shrubs, and trees along the streets and in the parks. The deposit of soot on the leaves of plants interferes with their growth, plugging up the stomata, or minute pores of the leaves, by means of which they absorb the carbon dioxide from the air, upon which they feed, converting it into sugars, starches, and carbohydrates. The soot also coats the leaves and reduces the amount of sunlight reaching them, and in this manner slows down the rate of growth of the plant. Plants cannot grow without sunlight. Experiments carried on at Leeds, England, have shown a direct effect of smoke upon the growth of plants, the growth of lettuce, for instance, in a very smoky district being only one-fourth of that in a clear district.[3]

One of the effects of a smoky atmosphere is the loss of daylight and of ultraviolet light due to the smoke. Smoke in the atmosphere absorbs the ultraviolet light coming from the sun and the sky. Various investigators have shown that both daylight and ultraviolet light are absorbed by smoke. The health department of the city of Baltimore found from 1926 to 1928 that the amount of ultraviolet light was 50 percent greater in the country than in the city, due to the absence of smoke.[4] The department of health in Chicago found losses of from 51 to 43 percent of the ultraviolet light in Chicago on smoky days.[5] During the Mellon Institute survey, H. H. Kimball found the ultraviolet light to be 60 percent less in Pittsburgh than in Sewickley, a small residential town 12

[3] Cohen and Ruston Smoke, A Study of Town Air, pp 23-33.

[4] Shrader, Coblentz, and Korff. Am Jour. Pub. Health, July 1929.

[5] Tonney, Heft, and Sommers: Jour. Prev. Med., March 1930.

miles to the northwest of Pittsburgh.[6] The United States Public Health Service found in New York in 1927 an average loss throughout the year of 21.5 percent of the daylight, due to smoke. On some days the loss was greater than 50 percent. In Baltimore the United States Public Health Service investigators found the average loss of daylight during the year 1929–30 to be 14.1 percent. On some days the loss was greater than 50 percent.[7]

The United States Public Health Service found during the years 1932 to 1933 that smoke and dust were deposited at the rate of 296 tons per square mile per year in Washington at Seventh and B Streets SW., of which 154 tons were carbon and 142 tons were ash. Some figures on the amount of dust deposited per square mile per year in some other American cities and in some foreign cities are given in the accompanying tables.

[6] H. H. Kimball: Mellon Institute, Smoke Investigation Bulletin No. 5.

[7] Pub. Health Bull. No. 197 and Pub. Health Rep., Feb. 3, 1933.

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TABLE 1.—*Settled dust and sulphur dioxide in American cities*

City	Investigator	Location	Year	Season of year	Average number of tons of dust deposited per square mile per year					Sulphur dioxide. Parts in a million of air	
					Total	Carbon	Ash	Tar	Iron oxide Fe_2O_3	Range	Average
Pittsburgh, Pa	Mellon Institute	Whole city	1912-13	Whole year	1,031	317	714	10.1	261	[1] 1.1	0.14
Salt Lake City, Utah	Bureau of Mines	do	1919-20		250	95	155			.6	0.0[illegible]
Grafton, W Va	do		1922		1,876	871	1,005				
Cleveland, Ohio	Cleveland Health Council	Whole city	1927-29	Whole year	780	[illegible]	552		120		
Baltimore, Md	Baltimore Health Department	Center of city	1928-29		1,800	990	810	8.7			
Washington, D C	Public Health Service	7th & B Sts; SW	1932-33	Whole year	296	154	142		15		

[1] During a fog.

TABLE 2.—*Settled dust per square mile per year in foreign cities*

City	Authority	Year	Tons per square mile per year	City	Authority	Year	Tons per square mile per year
London, England	Bureau of Mines	1910	58-426	Manchester, England	Bureau of Mines		[illegible]
Leeds, England	do		25-539	Hamburg, Germany	do		345-[illegible]
Glasgow, Scotland	do	1910-11	1,325	Osaka, Japan	Fujiwara	19[illegible]-29	[illegible]

DEATHS DURING WEEK ENDED DEC. 14, 1935

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec 14, 1935	Corresponding week, 1934
Data from 86 large cities of the United States		
Total deaths	8,712	8,429
Deaths per 1,000 population, annual basis	12.1	11.7
Deaths under 1 year of age	563	569
Deaths under 1 year of age per 1,000 estimated live births	52	54
Deaths per 1,000 population, annual basis, first 50 weeks of year	11.3	11.3
Data from industrial insurance companies		
Policies in force	67,807,743	67,072,330
Number of death claims	13,579	12,544
Death claims per 1,000 policies in force, annual rate	10.4	9.8
Death claims per 1,000 policies, first 50 weeks of year, annual rate	9.5	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Dec. 21, 1935, and Dec. 22, 1934

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 21, 1935, and Dec. 22, 1934

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934
New England States:								
Maine	2		1	1	255	21	0	1
New Hampshire		1			24	36	0	0
Vermont		1			79	1		0
Massachusetts	10	11			195	151	4	3
Rhode Island		6			122	3	1	0
Connecticut	7	2	7	8	76	316	2	0
Middle Atlantic States:								
New York	45	57	[1] 13	[1] 65	579	634	12	5
New Jersey	14	16	10	322	20	36	1	0
Pennsylvania	55	72			127	888	3	8
East North Central States:								
Ohio	37	69	9	3	52	238	8	1
Indiana	56	30	25	50		148	1	0
Illinois	73	68	34	57	20	1,212	4	7
Michigan	19	8	6	6	27	111	4	1
Wisconsin	3	3	55	17	75	452	2	3
West North Central States:								
Minnesota	3	1			54	728	1	1
Iowa	34	6		7	5	541	0	2
Missouri	46	27	96	92	15	71	2	1
North Dakota	2	4	2	6	14	94	0	0
South Dakota	9	4	1		2	40	0	0
Nebraska	9	5			17	89	2	1
Kansas	13	12	4		7	350	3	2
South Atlantic States:								
Delaware	2			2	102	3	0	0
Maryland [2, 3]	20	15	35	18	41	41	5	0
District of Columbia	16	10	1	9	1	1	1	0
Virginia	26	30			22	173	4	0
West Virginia	33	48	43	18	3	213	3	0
North Carolina [3, 4]	36	36	[illegible]	49	7	407	1	1
South Carolina	2	6	230	738		9	0	0
Georgia [3]	9	14	88				3	0
Florida [3]	11	10	4	1	1	3	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 21, 1935, and Dec. 22, 1934—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934
East South Central States:								
Kentucky	23	30	37	34	32	116	2	3
Tennessee	39	37	40	64	2	12	5	1
Alabama [3]	14	20	156	264	6	70	2	1
Mississippi [2]	3	8					1	0
West South Central States:								
Arkansas	8	13	82	89	3	5	0	0
Louisiana [3]	21	34	21	6	22	17	1	2
Oklahoma [6]	22	15	80	190		1	8	0
Texas [3]	97	83	185	239	14	39	6	2
Mountain States:								
Montana	7	17	22		20	78	0	1
Idaho		1	2	6	11	5	0	0
Wyoming		1			2	4	0	0
Colorado	11	2			7	342	0	1
New Mexico	11	2	3	10	2	23	0	0
Arizona	5	2	47	20		63	0	1
Utah [2]				3		24	1	0
Pacific States:								
Washington	2				157	79	3	2
Oregon	9	2	23	54	323	23	1	0
California	33	22	40	20	302	46	6	1
Total	897	871	1,393	2,438	2,845	7,907	98	47
First 51 weeks of year	37,290	39,628	116,947	63,615	719,482	720,951	5,476	2,233

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec 21, 1935	Week ended Dec 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934
New England States:								
Maine	2	0	17	30	0	0	3	2
New Hampshire	0	0	7	29	0	0	1	0
Vermont	1	0	11	14	0	0	1	1
Massachusetts	6	0	250	148	0	0	0	3
Rhode Island	0	0	31	8	0	0	0	1
Connecticut	0	0	40	39	0	0	1	0
Middle Atlantic States.								
New York	8	2	590	433	0	0	4	7
New Jersey	1	0	138	123	0	0	1	1
Pennsylvania	2	2	398	469	0	0	5	8
East North Central States.								
Ohio	1	0	298	477	1	1	4	5
Indiana	0	4	263	181	6	1	3	3
Illinois	3	2	593	658	2	1	6	29
Michigan	1	2	296	288	0	0	4	7
Wisconsin	0	1	445	390	8	8	1	0
West North Central States:								
Minnesota	1	1	301	185	5	5	1	2
Iowa	4	0	184	44	19	0	1	4
Missouri	0	0	192	68	4	3	3	3
North Dakota	0	0	67	27	3	5	0	0
South Dakota	0	0	53	28	6	4	3	1
Nebraska	0	0	249	40	20	15	0	0
Kansas	2	1	126	90	12	1	1	1
South Atlantic States:								
Delaware	0	0	19	4	0	0	1	0
Maryland [2 3]	1	0	101	108	0	0	15	1
District of Columbia	0	0	10	29	0	0	0	0
Virginia	1	1	50	97	0	8	4	5
West Virginia	0	1	75	126	0	0	2	10
North Carolina [3 4]	3	1	53	75	0	0	4	5
South Carolina	1	0	5	5	0	0	1	1
Georgia [3]	0	0	20	11	0	0	3	5
Florida [3]	0	0	6	7	0	0	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 21, 1935, and Dec. 22, 1934—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec 21, 1935	Week ended Dec 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934	Week ended Dec. 21, 1935	Week ended Dec. 22, 1934
East South Central States:								
Kentucky	0	0	46	43	0	0	3	2
Tennessee	1	0	41	52	0	1	2	5
Alabama [3]	0	0	17	12	1	5	1	3
Mississippi [2]	0	0	21	14	0	0	0	4
West South Central States:								
Arkansas	0	0	13	7	0	7	2	8
Louisiana [3]	1	1	12	25	0	1	9	17
Oklahoma [6]	0	0	36	25	0	1	3	7
Texas [3]	0	0	75	69	0	3	16	44
Mountain States:								
Montana	0	1	90	33	34	0	2	2
Idaho	0	0	45	4	0	1	0	0
Wyoming	0	0	80	19	3	4	0	1
Colorado	0	0	170	151	5	2	2	2
New Mexico	1	0	64	24	0	1	10	13
Arizona	0	0	30	25	0	0	0	2
Utah [2]	0	0	72	55	0	0	0	3
Pacific States:								
Washington	0	6	73	54	25	41	2	3
Oregon	2	1	47	46	1	3	3	2
California	9	6	280	135	8	0	8	4
Total	52	33	6,084	5,014	163	122	141	236
First 51 weeks of year	10,693	7,230	246,192	209,515	7,297	5,029	17,342	20,845

[1] New York City only.
[2] Week ended earlier than Saturday
[3] Typhus fever, week ended Dec 21, 1935, 29 cases, as follows Maryland, 1, North Carolina, 1; Georgia, 13; Alabama, 3; Louisiana, 1; Texas, 10
[4] Rocky Mountain spotted fever, week ended Dec 21, 1935, North Carolina, 1 case.
[5] Dengue, week ended Dec 21, 1935, Florida, 1 case.
[6] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November 1935										
Alabama	10	203	161	418	28	18	5	109	0	32
Idaho	1	3	20		56		1	297	1	12
Illinois	34	364	74	21	74		23	1,996	8	56
Kansas	6	71	45		29		2	560	42	21
Maryland	5	62	20	1	39		16	375	0	61
Minnesota	2	65	4		179		6	1,104	2	8
New York	30	132		8	1,776		97	1,697	0	47
North Dakota		7	21		51		2	194	9	3
Ohio	14	350	141		353		3	1,601	1	35
Pennsylvania	17	196		2	823	1	20	1,364	0	50
South Dakota	3	9	12		17		2	247	51	4
Tennessee	17	287	115	84	16	14	14	406	7	45
Texas	7	776	701	2,330	25	41	7	349	8	149
West Virginia	5	222	113		48		3	589	3	26

November 1935

Disease and State	Cases
Actinomycosis:	
Illinois	1
Anthrax:	
Illinois	1
Chicken pox:	
Alabama	212
Idaho	76
Illinois	1,701
Kansas	626
Maryland	249
Minnesota	1,026
New York	2,148
North Dakota	178
Ohio	1,992
Pennsylvania	3,397
South Dakota	141
Tennessee	139
Texas	77
West Virginia	270
Dengue:	
Texas	5
Diarrhea and enteritis:	
Ohio (under 2 years)	10
Dysentery:	
Alabama (amoebic)	2
Illinois (amoebic)	6
Illinois (bacillary)	2
Illinois (amoebic carriers)	19
Kansas (bacillary)	2
Maryland (bacillary)	6
Minnesota (amoebic)	2
Minnesota (bacillary)	5
New York (amoebic)	10
New York (bacillary)	46
Pennsylvania (bacillary)	1
Tennessee (amoebic)	2
Tennessee (bacillary)	16
Texas (amoebic)	3
Texas (bacillary)	27
Epidemic encephalitis:	
Alabama	1
Illinois	8
Kansas	4
Maryland	1
Minnesota	2
New York	10
Pennsylvania	5
Texas	1
Food poisoning:	
Kansas	1
Maryland	14
Ohio	3
German measles:	
Alabama	1
Illinois	29
Kansas	6
Maryland	28
New York	137
Ohio	10
Pennsylvania	183
Tennessee	3

Disease and State	Cases
Impetigo contagiosa:	
Illinois	9
Kansas	3
Maryland	41
Tennessee	23
Jaundice, epidemic:	
Minnesota	2
Lead poisoning:	
Illinois	2
Ohio	4
Pennsylvania	1
Mumps:	
Alabama	105
Idaho	50
Illinois	382
Kansas	165
Maryland	57
North Dakota	549
Ohio	568
Pennsylvania	1,068
South Dakota	66
Tennessee	33
Texas	401
West Virginia	41
Ophthalmia neonatorum:	
Alabama	1
Illinois	3
Maryland	3
New York	2
Ohio	67
Pennsylvania	3
Tennessee	4
Paratyphoid fever:	
Illinois	2
Maryland	1
New York	6
Texas	6
Puerperal septicemia:	
Illinois	3
Ohio	3
Rabies in animals:	
Alabama	87
Illinois	17
Kansas	6
Maryland	1
New York [1]	5
Texas	13
Rabies in man:	
Alabama	1
Rocky Mountain spotted fever:	
Pennsylvania	1
Scabies:	
Idaho	1
Kansas	4
Maryland	1
Tennessee	10
Septic sore throat:	
Idaho	2
Illinois	8
Kansas	3
Maryland	25
Minnesota	1
New York	57
North Dakota	3
Ohio	103
Tennessee	61
West Virginia	1

Disease and State	Cases
Tetanus:	
Alabama	7
Illinois	2
Kansas	1
Maryland	2
New York	2
Ohio	2
Tennessee	3
Trachoma:	
Alabama	1
Illinois	15
Ohio	1
South Dakota	3
Tennessee	1
Trichinosis:	
Minnesota	1
New York	22
Pennsylvania	1
Tularaemia:	
Illinois	6
Kansas	2
Minnesota	5
Ohio	4
Tennessee	1
Texas	1
Typhus fever:	
Alabama	37
New York	3
Tennessee	3
Texas	14
Undulant fever:	
Alabama	3
Idaho	1
Illinois	6
Kansas	13
Maryland	5
Minnesota	9
New York	11
North Dakota	1
Ohio	6
Pennsylvania	6
Tennessee	2
West Virginia	1
Vincent's infection:	
Illinois	24
Kansas	8
Maryland	27
New York [1]	62
North Dakota	6
Tennessee	6
Whooping cough:	
Alabama	74
Idaho	1
Illinois	707
Kansas	114
Maryland	95
Minnesota	143
New York	1,502
North Dakota	14
Ohio	511
Pennsylvania	1,113
South Dakota	9
Tennessee	115
Texas	100
West Virginia	70

[1] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 14, 1935

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	1	0	0	3	0	0	0	0	24	20
New Hampshire:											
Concord	0	...	1	0	2	0	0	0	0	1	13
Manchester	0	...	2	0	1	4	0	0	0	0	16
Nashua	0	...	...	0	...	0	0	...	0	0	...
Vermont:											
Barre	...	...	...	...	...	...	...	...	...	...	...
Burlington	0	...	0	0	0	0	0	0	1	0	2
Rutland	0	...	0	0	2	1	0	0	0	0	10
Massachusetts:											
Boston	0	...	1	43	26	64	0	11	0	11	236
Fall River	2	...	0	1	7	2	0	0	0	0	28
Springfield	0	...	0	0	2	3	0	0	0	11	35
Worcester	0	...	0	1	7	25	0	4	0	2	50
Rhode Island:											
Pawtucket	...	...	...	...	...	...	...	...	...	...	...
Providence	0	...	0	1	5	14	0	1	0	5	60
Connecticut:											
Bridgeport	4	1	0	0	0	7	0	0	0	3	37
Hartford	0	...	0	1	8	4	0	0	0	16	51
New Haven	0	...	0	0	2	0	0	0	0	10	46
New York:											
Buffalo	0	...	0	15	18	54	0	8	0	5	147
New York	36	19	6	114	116	170	0	72	10	105	1,471
Rochester	2	1	0	0	1	5	0	5	2	4	64
Syracuse	0	...	0	0	4	7	0	0	0	26	36
New Jersey:											
Camden	1	...	0	0	2	2	0	0	0	0	47
Newark	1	6	1	0	14	30	0	4	0	37	109
Trenton	0	...	1	0	2	8	0	2	0	1	37
Pennsylvania:											
Philadelphia	9	3	3	72	37	95	0	18	2	106	496
Pittsburgh	5	1	1	27	32	90	0	6	0	14	197
Reading	0	...	0	1	2	2	0	2	0	0	38
Scranton	0	...	...	3	0	8	0	...	0	0	...
Ohio:											
Cincinnati	6	...	2	5	10	14	0	8	0	1	143
Cleveland	0	46	3	6	20	28	0	11	0	44	182
Columbus	3	...	0	0	8	25	0	4	1	0	103
Toledo	0	2	2	8	7	5	0	4	0	8	74
Indiana:											
Anderson	2	...	0	0	1	0	0	1	0	3	13
Fort Wayne	4	...	0	0	4	10	6	2	0	0	27
Indianapolis	6	...	0	1	26	32	0	3	5	28	115
Muncie	0	...	0	0	2	0	0	0	0	0	11
South Bend	0	...	1	1	0	3	0	0	0	0	19
Terre Haute	0	...	0	0	0	0	0	0	0	0	35
Illinois:											
Alton	10	...	1	1	0	4	0	0	0	0	7
Chicago	10	11	6	12	58	242	0	39	0	136	734
Elgin	0	...	0	1	1	0	0	1	0	0	11
Moline	0	...	0	0	0	0	0	0	0	0	9
Springfield	0	1	0	2	1	2	0	1	0	0	21
Michigan:											
Detroit	15	6	1	5	30	84	0	13	1	134	272
Flint	2	...	0	2	3	19	0	1	0	18	31
Grand Rapids	0	...	1	1	0	17	0	1	0	9	41
Wisconsin:											
Kenosha	0	...	0	2	1	0	0	0	0	0	6
Milwaukee	0	1	1	5	6	0	0	3	0	98	106
Racine	0	...	0	4	0	14	0	0	0	5	16
Superior	0	...	0	0	0	7	0	0	0	0	11
Minnesota:											
Duluth	0	...	0	0	2	1	0	2	0	3	32
Minneapolis	5	...	0	18	7	128	0	3	0	11	111
St. Paul	0	...	0	1	4	39	0	3	0	4	61
Iowa:											
Cedar Rapids	0	...	...	1	0	6	0	...	0	0	...
Davenport	0	...	...	0	...	4	0	...	0	0	...
Des Moines	0	...	...	0	...	5	0	...	0	1	37
Sioux City	1	...	...	0	...	12	0	...	0	1	...
Waterloo	4	...	...	0	...	3	0	...	0	0	...

City reports for week ended Dec. 14, 1935—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	2	2	1	1	7	15	0	8	0	1	109
St. Joseph	8	------	0	0	11	3	0	2	0	1	45
St. Louis	22	------	1	1	19	47	0	7	0	7	286
North Dakota:											
Fargo	0	------	0	0	2	7	0	0	0	0	11
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	1	0	2	0	0	0	0	4
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Nebraska.											
Omaha	7	------	0	4	6	108	9	3	0	0	67
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	5
Topeka	0	------	0	0	5	9	0	0	0	0	18
Wichita	0	------	0	2	1	12	0	1	0	0	30
Delaware:											
Wilmington	0	------	0	1	4	1	0	3	0	4	37
Maryland:											
Baltimore	7	1	0	1	21	39	0	17	2	16	224
Cumberland	6	------	0	0	0	1	0	0	0	0	20
Frederick	0	------	0	0	1	0	0	0	0	0	7
District of Columbia:											
Washington	33	------	0	3	22	19	0	15	6	5	187
Virginia:											
Lynchburg	3	------	0	0	3	3	0	1	0	4	14
Norfolk	0	------	0	0	4	5	0	1	0	2	32
Richmond	0	------	0	0	6	8	0	2	0	0	58
Roanoke	3	------	0	0	0	2	0	1	0	0	18
West Virginia:											
Charleston	5	------	0	0	2	2	0	0	0	0	17
Huntington	1	------	------	0	------	2	0	------	0	0	------
Wheeling	0	------	0	0	1	0	0	0	0	0	21
North Carolina:											
Raleigh	0	------	0	0	1	0	0	0	0	0	14
Wilmington	0	------	0	1	1	0	0	1	0	1	14
Winston-Salem	0	1	0	1	3	6	0	0	0	0	16
South Carolina.											
Charleston	2	14	0	0	0	3	0	0	0	1	14
Florence	0	------	0	0	0	0	0	0	0	0	7
Greenville	0	------	0	0	2	1	0	0	0	2	9
Georgia:											
Atlanta	8	48	0	1	14	21	0	0	2	0	103
Brunswick	0	------	0	0	0	0	0	0	0	0	6
Savannah	0	13	4	0	5	3	0	1	0	0	39
Florida											
Miami	1	2	0	0	1	2	0	2	0	0	38
Tampa	1	1	1	0	1	2	0	1	1	0	27
Kentucky:											
Ashland	2	------	------	0	------	0	0	------	0	0	------
Covington	2	------	0	0	4	3	0	0	0	0	0
Lexington	1	------	0	0	3	2	0	2	0	0	24
Tennessee:											
Knoxville	6	------	0	0	0	4	0	1	0	0	18
Memphis	6	------	1	0	12	8	0	5	0	5	91
Nashville	3	------	3	1	7	1	0	1	1	0	59
Alabama.											
Birmingham	1	5	1	6	12	0	0	2	0	0	74
Mobile	1	1	1	0	4	2	0	0	0	0	31
Montgomery	1	------	------	2	------	2	0	------	0	0	------
Arkansas:											
Fort Smith	1	------	------	0	------	1	0	------	0	0	------
Little Rock	0	------	0	0	3	6	0	1	0	0	5
Louisiana:											
Lake Charles	1	------	0	0	0	0	0	0	0	0	6
New Orleans	10	5	6	7	16	14	0	11	5	0	174
Shreveport	0	------	0	0	11	3	0	1	2	0	41
Texas.											
Dallas	6	2	2	0	9	4	0	1	0	4	49
Fort Worth	9	------	1	2	5	3	0	3	0	5	36
Galveston	3	------	0	0	3	3	0	1	0	0	18
Houston	12	------	1	5	13	2	0	5	0	0	93
San Antonio	3	------	2	0	7	0	0	2	0	0	41

City reports for week ended Dec. 14, 1935—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	0		0	3	1	18	0	0	0	0	10
Great Falls	0		0	0	1	3	0	0	0	2	11
Helena	0		0	0	4	0	0	0	0	0	7
Missoula	0		0	0	6	18	0	0	0	0	14
Idaho:											
Boise	0		0	0	1	4	0	0	0	0	7
Colorado:											
Colorado Springs	0		0	0	1	7	0	2	0	5	17
Denver											
Pueblo	0		0	0	3	20	0	0	0	1	9
New Mexico:											
Albuquerque	1	2	2	0	3	12	0	2	0	4	20
Utah:											
Salt Lake City	0		0	4	4	60	0	2	0	0	42
Nevada:											
Reno											
Washington:											
Seattle	0		1	7	3	26	0	5	0	6	80
Spokane	0	1	1	8	2	0	2	0	0	0	30
Tacoma	0		0	1	3	4	0	1	0	1	25
Oregon:											
Portland	0	1		43	9	16	0	0	1	1	87
Salem	0			0		2	0		1	1	
California:											
Los Angeles	10	20	5	28	25	73	0	11	1	19	323
Sacramento	2		0	1	2	27	0	1	0	8	30
San Francisco	1		0	43	8	29	0	7	0	26	167

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	2
Massachusetts:			
Boston	1	1	5
Springfield	1	1	0
Worcester	1	1	0
Connecticut:			
Bridgeport	0	1	0
New York:			
New York	5	3	2
New Jersey:			
Camden	0	0	1
Pennsylvania:			
Philadelphia	1	2	3
Pittsburgh	1	0	0
Ohio:			
Cincinnati	1	0	0
Cleveland	1	0	0
Toledo	0	1	0
Indiana:			
Indianapolis	1	1	0
Illinois:			
Chicago	4	2	2
Springfield	2	1	0
Michigan:			
Detroit	3	0	0
Wisconsin:			
Kenosha	1	1	0
Minnesota:			
Minneapolis	0	1	0
Iowa:			
Cedar Rapids	0	0	1

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Missouri.			
Kansas City	0	0	1
St. Joseph	2	0	0
St. Louis	1	0	0
Nebraska:			
Omaha	1	0	0
Maryland:			
Baltimore	3	0	0
District of Columbia:			
Washington	3	1	0
West Virginia:			
Wheeling	0	1	0
South Carolina:			
Charleston	2	1	0
Tennessee:			
Knoxville	0	1	0
Alabama:			
Birmingham	2	0	0
Mobile	0	1	0
Louisiana:			
New Orleans	2	1	0
Texas:			
Galveston	2	0	0
Colorado:			
Colorado Springs	1	1	0
Washington:			
Seattle	1	0	0
California:			
Los Angeles	3	2	1
San Francisco	1	0	0
Oregon:			
Portland	2	0	2

Epidemic encephalitis.—Cases: Detroit, 2; Fargo, 1.

Pellagra.—Cases: Cincinnati, 1; Winston-Salem, 1; Charleston, S. C., 1; Atlanta, 1; Miami, 1; New Orleans, 2; San Francisco, 1.

Typhus fever.—Cases: Charleston, S. C., 1; Savannah, 1; Lake Charles, 1.

FOREIGN AND INSULAR

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for December 27, 1935, pages 1834-1848. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued January 31, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

India—Bassein.—During the week ended December 14, 1935, 1 fatal case of plague was reported in Bassein, India.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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CONTENTS

PUBLIC HEALTH REPORTS

VOL. 51 JANUARY 10, 1936 NO. 2

CULTIVATION OF THE VIRUS OF LYMPHOCYTIC CHORIO-MENINGITIS IN THE DEVELOPING CHICK EMBRYO

By IDA A. BENGTSON, *Senior Bacteriologist* and J. G. WOOLEY, *Acting Assistant Surgeon, United States Public Health Service*

The chorio-allantoic membrane of the chick embryo has been found suitable as a medium for the cultivation of a considerable number of the filterable viruses and also for the rickettsiae of Rocky Mountain fever and endemic typhus fever. The rapidly developing cellular structure of the membrane is often favorable for growth, although the hatched chick or the adult fowl may be resistant to the disease, as is true of the viruses of herpes simplex, equine encephalomyelitis and other diseases.

The ready susceptibility of a number of laboratory animals to the virus of lymphocytic choriomeningitis as reported by Armstrong and Lillie (*1*) suggested the possibility that the chick embryo by inoculation of the chorio-allantoic membrane might also be susceptible. This was found to be the case, and the virus was continued through eight passages in the egg without great difficulty. The possibility was considered whether the virus might be more concentrated in the embryo than in other susceptible animals, and it was also thought that some information might be gained in regard to the nature of the virus by a microscopic study of the cells of the chorio-allantoic membrane.

The technique of inoculation and transfer of the virus was similar to that used for the cultivation of the virus of Rocky Mountain spotted fever by the senior author (*2*) except that brain material as well as membrane were used in making the transfers.

THE VIRUS USED FOR INITIATING GROWTH

In the first two series of eggs, mouse brains in the thirty-fifth and thirty-seventh generations of the virus were used for initiating growth. These were taken on the seventh day following inoculation of the mice, when well developed symptoms were in evidence. As described by Armstrong and Lillie, a pronounced tremor and a tendency to spastic convulsion are the most conspicuous symptoms in mice. The titrations of these viruses in mice are shown in table 1. Both were virulent in dilutions of 1×10^{-4}.

TABLE 1.—*Titrations of viruses (mouse brains) used for initiating growth in the chick embryos*

Virus	Serial passage in mice	Dilutions of mouse brain	Mice inoculated intracerebrally	
			Died	Survived
E 35	35th	1×10^{-3}	4 (7, 7, 7, 13)[1]	0
		1×10^{-4}	4 (7, 8, 9, 9)	0
		1×10^{-5}	1 (9)	3
		1×10^{-6}	0	4
E 37	37th	1×10^{-1}	4 (7, 7, 7, 7)	0
		1×10^{-2}	4 (6, 6, 6, 7)	0
		1×10^{-3}	4 (6, 6, 7, 7)	0
		1×10^{-4}	3 (7, 8, 9)	1

[1] The figures in parentheses indicate days on which the death of mice occurred.

The brains were weighed and diluted with a volume of sterile 0.85-percent buffered salt solution equal to 10 times the weight of the brain in grams. This was designated as 1×10^{-1} dilution. Further dilutions were made from this, at times up to 1×10^{-5} or 1×10^{-6}. The inoculum used for the chick embryos was 0.1 cc, this amount being inoculated with a hypodermic syringe through the sterile vaseline with which a sterile coverslip was held in place over a triangular opening in the egg shell. Fertile eggs previously incubated 11 or 12 days at 39.5° C. were used in the tests. The period of incubation after inoculation was uniformly 7 days, and the temperature of incubation 37.5° C.

SERIAL PASSAGE OF THE VIRUS

In the first series of eggs the dilutions of the mouse brain ranging from 1×10^{-1} to 1×10^{-6} were each inoculated on the chorio-allantoic membrane of three eggs. The brain and some of the membrane from one of each group of three eggs were tested on mice. Both the brain and the membrane of the embryos inoculated with dilutions ranging from 1×10^{-1} to 1×10^{-5} produced positive symptoms in mice, while negative results were obtained with the 1×10^{-6} dilution. The results indicate high susceptibility of the embryo to the virus and that the virus was present in about the same concentration in the membrane and in the brain (table 2).

Table 2.—*Growth of the virus in the chick embryo*

[Virus A 35. Date: May 8, 1935]

Dilutions of mouse brain used for inoculating embryos	Numbers of eggs	Number of embryo used for mouse tests	Dilutions of embryo brains used for mice	Mice inoculated		Dilutions of embryo membranes used for mice	Mice inoculated	
				Died	Survived		Died	Survived
1×10^{-6}	1 to 3	1	1×10^{-1}	0	2	1×10^{-1}	0	3
1×10^{-5}	4 to 6	4	1×10^{-1}	2 (6, 6)[1]	0	1×10^{-1}	2 (5, 12)[1]	1
1×10^{-4}	7 to 9	8	1×10^{-1}	2 (8, 8)	0	1×10^{-1}	3 (4, 8, 8)	0
1×10^{-3}	10 to 12	11	1×10^{-1}	2 (8, 8)	0	1×10^{-1}	2 (11, 12)	1
1×10^{-2}	13 to 15	14	1×10^{-1}	2 (8, 9)	0	1×10^{-1}	3 (8, 9, 9)	0
1×10^{-1}	16 to 18	17	1×10^{-1}	2 (10, 14)	0	1×10^{-1}	3 (1, 4, 10)	0

[1] Figures in parentheses indicate days on which death occurred

The virus was continued through a second series of eggs for eight passages during the period from June 5 to July 31, 1935. The passage of the virus was carried out with brain material during the first five generations and then with both brain and membrane during the sixth to eighth generations (table 3).

TABLE 3.—*Serial passage of the virus in the chick embryo*

Date	Generation	Number of the embryo used for passage of virus	Dilutions of mouse brain virus used for inoculating embryos	Numbers of eggs inoculated	Number of the embryo used for mouse test	Dilutions of embryo brain	Mice inoculated: Died	Mice inoculated: Survived	Dilutions of embryo membrane	Mice inoculated: Died	Mice inoculated: Survived
			1×10^{-4}	1 to 6		1×10^{-3}	2 (9, 10)[1]	2			
June 5, 1935	1		1×10^{-3}	7 to 12	9	1×10^{-2}	4 (7, 7, 8, 8)	0			
			1×10^{-2}	13 to 18		1×10^{-1}	3 (7, 7, 10)	1			
			Dilutions of embryo virus used for inoculating embryos								
						1×10^{-3}	4 (7, 7, 7, 8)	0			
					15	1×10^{-2}	4 (7, 7, 7, 9)	0			
						1×10^{-1}	4 (7, 7, 7, 8)	0			
			1×10^{-3}	19 to 21		1×10^{-3}	4 (7, 7, 8, 9)	0			
June 12, 1935	2	9 (brain)	1×10^{-2}	22 to 24	24	1×10^{-2}	4 (2, 2, 7, 7)	0			
			1×10^{-1}	25 to 27		1×10^{-1}	4 (1, 2, 2, 8)	0			
			1×10^{-3}	28 to 30		1×10^{-3}	4 (7, 7, 8, 10)	0			
		15 (brain)	1×10^{-2}	31 to 33	33	1×10^{-2}	4 (6, 6, 7, 7)	0			
			1×10^{-1}	34 to 36		1×10^{-1}	3 (7, 7, 7)	0			
			1×10^{-3}	37 to 39		1×10^{-3}	0	4			
June 19, 1935	3	33 (brain)	1×10^{-2}	40, 41	45	1×10^{-2}	0	4			
			1×10^{-1}	42, 43		1×10^{-1}	0	4			
			1×10^{-3}	44, 45		1×10^{-3}	0	4			
		24 (brain)	1×10^{-2}	46, 47	47	1×10^{-2}	3 (1, 7, 9)	1			
			1×10^{-1}	48, 49		1×10^{-1}	4 (0, 7, 10, 10)	0			
			1×10^{-3}	54, 55							
June 26, 1935	4	45 (brain)	1×10^{-2}	52, 53	50	1×10^{-1}	1 (1)	2			
			1×10^{-1}	50, 51							
						1×10^{-3}	2 (8, 9)	1			
					56	1×10^{-2}	3 (6, 8, 8)	0			
			1×10^{-3}	60, 61		1×10^{-1}	3 (2, 6, 6)	0			
		47 (brain)	1×10^{-2}	58, 59		1×10^{-3}	0	3			
			1×10^{-1}	56, 57	58	1×10^{-2}	0	3			
						1×10^{-1}	0	3			
					70	1×10^{-1}	3 (7, 7, 7)	0			
			1×10^{-3}	62 to 67	63	1×10^{-1}	3 (6, 6, 7)	0	1×10^{-1}	3 (6, 6, 7)	0
			1×10^{-2}	68 to 73	70	1×10^{-1}	3 (0, 7, 8)	0	1×10^{-1}	3 (6, 7, 8)	0
July 3, 1935	5	56 (brain)							1×10^{-3}	3 (1, 6, 6)	0
			1×10^{-1}	74 to 78	76	1×10^{-3}	3 (7, 7, 7)	0	1×10^{-2}	3 (7, 7, 8)	0
									1×10^{-1}	2 (6, 6)	1
									1×10^{-5}	0	3
			1×10^{-3}	79 to 81					1×10^{-4}	1 (8)	2
July 10, 1935	6	76 (membrane)	1×10^{-2}	82 to 84	83				1×10^{-3}	3 (5, 7, 8)	0
			1×10^{-1}	85 to 87					1×10^{-2}	3 (5, 5, 7)	0
									1×10^{-1}	3 (6, 6, 6)	0

						1X10^-5	0	3			
		76 (brain)	1X10^-3	88 to 90	91	1X10^-4	1 (8)	2			
			1X10^-2	91 to 93		1X10^-3	3 (2, 7, 8)	0			
			1X10^-1	94 to 96		1X10^-2	3 (6, 7, 8)	0			
						1X10^-1	3 (3, 6, 6)	0			
			1X10^-5	97 to 99					1X10^-5	1 (5)	2.
			1X10^-4	100 to 102					1X10^-4	0	3.
July 17, 1935	7	83 (membrane)	1X10^-3	103 to 105	108				1X10^-3	0	2.
			1X10^-2	106 to 108					1X10^-2	2 (9, 9)	1.
			1X10^-1	109 to 111					1X10^-1	3 (7, 8, 10)	0.
						1X10^-5	0	3			
						1X10^-4	0	3			
			1X10^-5	112 to 114	124	1X10^-3	1 (0)	2			
			1X10^-4	115 to 117		1X10^-2	2 (7, 13)	1			
		91 (brain)	1X10^-3	118 to 120		1X10^-1	1 (7)	2[2]			
			1X10^-2	121 to 123	114	1X10^-1	0	3			
			1X10^-1	124 to 126	117	1X10^-1	0	3			
					120	1X10^-1	0	3			
					125	1X10^-1	3 (6, 6, 6)	0			
					122[3]	1X10^-1	3 (0, 7, 7)	0			
			1X10^-5	127, 128	127				1X10^-1	1 (0)	2.
			1X10^-4	129, 130	129				1X10^-1	0	3.
July 24, 1935	8	108 (membrane)	1X10^-3	131, 132	131				1X10^-1	1 (1)	2.
			1X10^-2	133, 134	133				1X10^-1	0	3.
			1X10^-1	135, 136	136				1X10^-1	3 (1, 1, 8)	0.
			1X10^-5	137, 138	137	1X10^-1	0	3			
			1X10^-4	139, 140	139	1X10^-1	0	3			
		122 (brain)	1X10^-3	141, 142	141	1X10^-1	3 (7, 7, 8)	0			
			1X10^-2	143, 144	143	1X10^-1	0	3			
			1X10^-1	145, 146[4]							

[1] Figures in parentheses indicate days on which death occurred
[2] Symptoms.
[3] Liver.
[4] Both embryos died

In figure 1 is presented a diagram showing only the embryos with which passage was continued and the dilutions used for each passage.

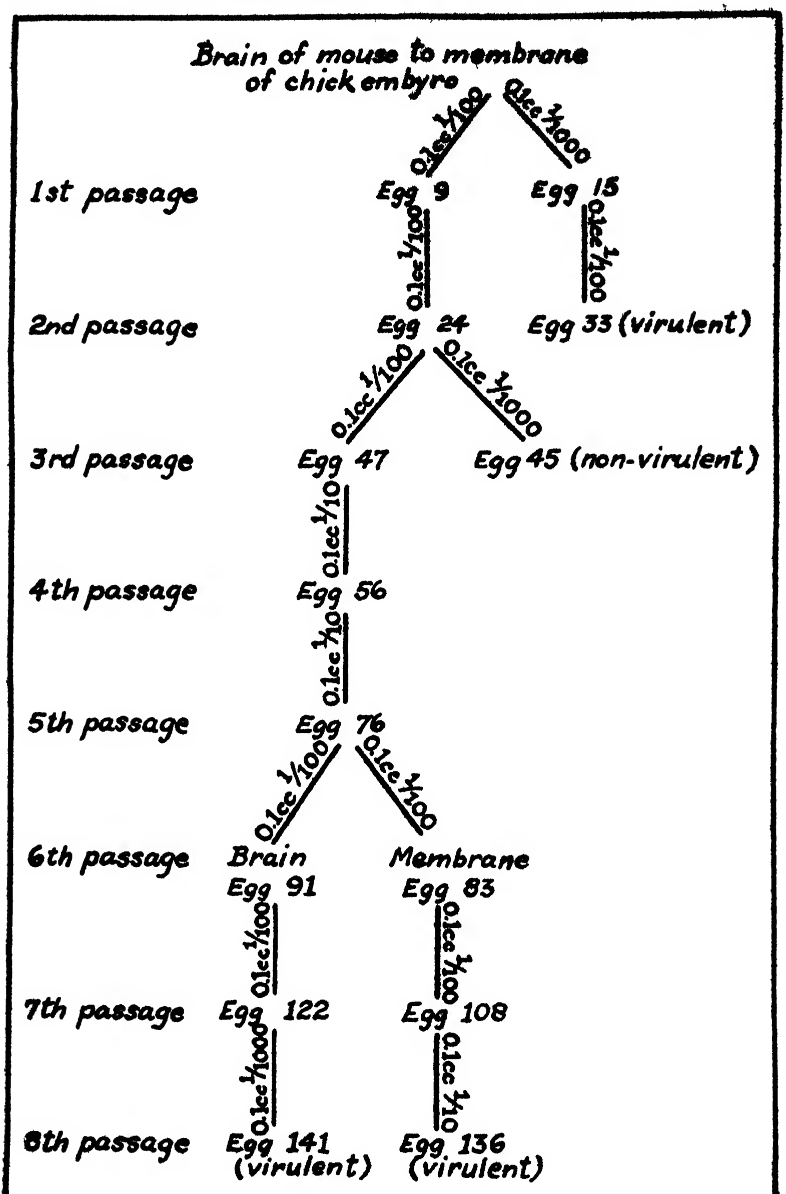

FIGURE 1 — Diagram showing the embryos with which passage was continued and the dilutions used for each passage.

A computation of the total dilution indicates that the virus in embryo 141 (brain) was present in a dilution of at least 1×10^{-23} of the original

virus and in embryo 136 (membrane) in a dilution of at least 1×10^{-21}. The virus is not confined to the membrane and the brain, and therefore the dilution is much higher than that indicated by the figures.

The membranes and brains of the embryos were usually tested by the intracerebral inoculation of mice in several different dilutions. In most cases they were infective in dilutions of 1×10^{-3}, using 0.03 cc of this dilution for inoculating the mice intracerebrally. In the sixth generation a 1×10^{-4} dilution of the brain and membrane of the embryos were both infective for one out of three mice in each case. In a few cases there seemed to be a "pre-zone" in the activity of the virus, some of the animals receiving the 1×10^{-1} dilution failing to develop as definite symptoms or even surviving the inoculation, while those on the 1×10^{-2} and 1×10^{-3} dilutions reacted characteristically.

Judging from the titrations made on mice there was apparently some variation in the strength of the virus from generation to generation. Considering the results as a whole, however, there certainly was no evidence that the virus increased in virulence for the embryo. The number of negative results obtained toward the end of the series indicate rather a decrease in virulence.

The virus is probably more virulent for the mouse than for the chick embryo, as the embryos as a rule survived longer. Mice usually died on the seventh day following inoculation. There were always living embryos from which to continue the virus passage at this time. There was, however, some evidence that the virus killed the embryos on the ninth and tenth days, as a number were found dead on those days following inoculation.

CONFIRMATION OF THE VIRUS

The symptoms and pathology produced in mice and the period of survival after inoculation were characteristic of lymphocytic choriomeningitis. Embryo membrane virus of the sixth generation was used in the test for the confirmation of the virus. Dilutions of $\frac{1}{33}$, $\frac{1}{333}$, and $\frac{1}{1000}$ of the virus were made with 0.85 percent sodium chloride and inoculated intracerebrally into white mice, using 3 mice for each dose. Two of the mice inoculated with the $\frac{1}{33}$ dilution, 2 with the $\frac{1}{333}$, and 1 with the $\frac{1}{1000}$ dilution died from the seventh to the fourteenth day following inoculation, with symptoms commonly seen in mice inoculated with the lymphocytic choriomeningitis virus. The remaining mouse inoculated with the $\frac{1}{333}$ dilution, ill with characteristic symptoms, was etherized *in extremis* and was used in the mouse-protection tests with blood serum of one convalescent monkey that had recovered after being inoculated with virus of lymphocytic choriomeningitis, with blood serum from a human convalescent from clinically diagnosed lymphocytic choriomeningitis, and with sera from two normal monkeys. Each of the convalescent sera contained antibodies which

protected the mice from clinical manifestations of the disease, while mice receiving virus plus sera from normal monkeys received slight if any protection against the virus. A protocol of the test is shown in table 4.

TABLE 4.—*Confirmation of the virus*

Virus plus 2 parts of—	Dilution of virus	Mice inoculated	
		Died	Survived
Convalescent monkey serum	1/33	1 (10)[1]	3
	1/333	0	4
	1/1000	0	4
Convalescent human serum	1/33	1 (9)	3
	1/333	1 (9)	3
	1/1000	0	4
Normal monkey serum	1/33	4 (7, 7, 8, 9)	0
	1/333	4 (8, 8, 9, 9)	0
	1/1000	1 (13)	3
Normal monkey serum	1/33	4 (8, 8, 8, 8)	0
	1/333	1 (10)	3
	1/1000	1 (5)	3

[1] Figures in parentheses indicate days on which death occurred.

As further confirmation of the virus, the brain of a mouse which had received virus plus normal monkey serum and which had died during the test was removed and examined in the division of pathology of this laboratory, where the diagnosis of lymphocytic choriomeningitis was made.

DISTRIBUTION OF THE VIRUS IN THE EMBRYO

It is probable that the virus was distributed throughout the embryo. In the tests, as carried out, the infectivity of the membrane and of the brain often seemed to run a parallel course, as they were infective in the same dilutions. In the seventh generation the livers of two of the embryos when inoculated into mice produced characteristic symptoms and caused the death of the mice in 5 to 8 days. In the eighth generation the filtrate of the amniotic fluid containing also blood was infectious for mice.

THE LESION

There was no such marked lesion at the site of inoculation as occurred in the case of Rocky Mountain spotted fever (Bengtson and Dyer). There was a slight thickening of the membrane, and in some cases there were small, discrete, irregular cloudy areas which were below the surface of the ectodermal layer. The histological studies of the membranes and also of the embryos are reported separately by Dr. Lillie.[1]

[1] See the following article.—Ed.

EXPERIMENTS WITH THE FILTERED VIRUS

Three experiments were made with filtered virus. In conducting these experiments, macerated infected mouse brains were suspended in sterile buffered salt solution and the suspensions centrifuged for 10 to 15 minutes at low speed to precipitate the heavier particles. A portion of the supernatant fluid was then filtered through Berkefeld N candles and the filtrate centrifuged at high speed (15,000 revolutions per minute) for 30–45 minutes. A very slight precipitate was discernible in the tubes after centrifuging.

The low-speed supernatant fluid, the high-speed supernatant fluid, and a suspension of the high-speed precipitate from the filtrate were tested by the intracerebral inoculation of mice to determine the concentration of the virus in the various portions. In attempting to infect the embryos the suspension of the high-speed centrifugate only was used.

In the first experiment the high-speed centrifugate was virulent for mice, but negative results were obtained in the chick embryos as determined by the inoculation of embryo material into mice. In the second experiment the high-speed centrifugate was nonvirulent, and consequently the embryos were not tested for virulence. In the third experiment the high-speed centrifugate was virulent for both mice and embryos. Typical symptoms followed by death occurred in mice inoculated with the embryo material.

The titrations of the virus used for inoculating the chick embryos in the first experiment are shown in table 5. The results indicate a definite concentration of the virus by high-speed centrifugation. The high speed centrifugate was virulent for mice in a dilution up to 1×10^{-6}, while the supernatant fluid was virulent in a dilution of only 1×10^{-1}. The unfiltered suspension was virulent in a dilution of 1×10^{-2} or possibly 1×10^{-3}.

TABLE 5.—*Titration of high speed centrifugate of mouse brain virus E 54*

SUSPENSION OF HIGH SPEED CENTRIFUGATE

Dilutions	Mice inoculated	
	Died	Survived
1×10^{-1}	3 (1, 6, 7)	0
1×10^{-2}	3 (6, 7, 7)	0
1×10^{-3}	3 (7, 7, 7)	0
1×10^{-4}	3 (7, 7, 8)	0
1×10^{-5}	3 (1, 8, 8)	0
1×10^{-6}	2 (8, 9)	1

TABLE 5.—*Titration of high speed centrifugate of mouse brain virus E 54*—Contd.

TITRATION OF SUPERNATANT FLUID OF HIGH SPEED CENTRIFUGATE

Dilutions	Mice inoculated	
	Died	Survived
Original	1 (1)	2
1×10^{-1}	2 (7, 8)	1
1×10^{-2}	2 (1, 1)	1
1×10^{-3}	2 (2, 6)	1

TITRATION OF SUPERNATANT FLUID OF LOW SPEED CENTRIFUGATE

Dilutions	Mice inoculated	
	Died	Survived
1×10^{-1}	3 (6, 7, 8)	0
1×10^{-2}	3 (0, 1, 7)	0
1×10^{-3}	3 (4, 4, 4)	0
1×10^{-4}	1 (0)	2
1×10^{-5}	0	3

The titration of the virus used in the third experiment is shown in table 6. In this case the high speed centrifugate was virulent in a dilution up to 1×10^{-3} while the supernatant fluid was virulent in a dilution up to 1×10^{-1}. The virus was apparently not concentrated to the extent that it was in the preceding case.

TABLE 6.—*Titration of high-speed centrifugate of mouse brain virus E 56*

	Suspension of high-speed centrifugate		Supernatant fluid of high-speed centrifugate	
Dilutions	Mice inoculated		Mice inoculated	
	Died	Survived	Died	Survived
Undiluted			3 (6, 6, 7)	0
1×10^{-1}	6 (6, 6, 6, 7, 7, 7)	0	3 (7, 7, 7)	0
1×10^{-2}	3 (6, 7, 7)	0	0	3
1×10^{-3}	3 (3, 6, 6)	0	0	3
1×10^{-4}	1 (1)	2	1 (2)	2
1×10^{-5}	1 (7)	2		
1×10^{-6}	1 (1)	2		

In the third experiment chick embryos were inoculated with the 1×10^{-1} and 1×10^{-2} dilutions of the high-speed centrifugate. After 1 week's incubation the brains and membranes of the embryos which survived were tested for virulence by the intracerebral inoculation of mice. The results are shown in table 7. It is indicated that the virus multiplied or at least survived on the chorio-allantoic membrane. In all three groups, mice inoculated with the membranes developed symptoms and died on the sixth or seventh day. In the case of the

mice inoculated with the brains from the embryos, symptoms developed more slowly, but the results were definite and conclusive in the case of some of the embryos. Apparently the virus was present in a less concentrated form in the brain than in the membrane of the embryo.

TABLE 7.—*Results of inoculation of chick embryos with the high-speed centrifugate of a filtrate of lymphocytic choriomeningitis virus*

Nos. of chick embryos	Dilutions of material used for inoculations	Mice inoculated with—			
		Membranes		Brains	
		Died	Survived	Died	Survived
1	1×10^{-1}	2 (7, 7)	1	2 (0, 7)	1
	1×10^{-2}	3 (6, 6, 7)	0	2 (0, 2)	1
10, 11	1×10^{-1}	3 (6, 6, 7)	0	3 (8, 9, 9)	0
	1×10^{-2}	3 (6, 6, 6)	0	3 (0, 3, 8)	0
14, 15, 19	1×10^{-1}	3 (0, 4, 6)	0	1 (6)	2
	1×10^{-2}	3 (3, 6, 7)	0	2 (2, 5)	1

The virus was continued through three passages in the chick embryo, and it is probable that propagation could be continued further in the same way as that initiated by the unfiltered material.

EFFECT OF THE VIRUS ON THE HATCHED CHICK

It seemed of interest to determine whether chicks hatched from embryos which had been inoculated with the virus would show any evidence of the effect of the virus, and also to determine whether chicks inoculated with the virus several days after hatching would show any effects.

In order to determine the effect on the chick of virus inoculation prior to hatching, 21 fertile eggs which had been incubated for 13 days were inoculated with a suspension of four infected mouse brains. The same number of uninoculated fertile eggs served as controls. Nine of the inoculated eggs and 6 of the uninoculated hatched. There was a rather marked difference in the appearance of the two groups of chicks which was more apparent on the second or third day after hatching. The chicks of the inoculated group were definitely less active, the down had a roughened appearance, and the eyes appeared somnolent. However, all of these except one apparently recovered, and in a short time they appeared as healthy as the uninoculated group. The one exception was a chick which had a very marked deformity of the legs which it was considered might be evidence of pronounced symptoms of lymphocytic choriomeningitis. This chick was etherized and a suspension made of the brain for titration in mice. Mice were also inoculated intracerebrally with

some of the heart blood and with suspensions of the liver and heart muscle. None of the mice developed symptoms or died as the result of the inoculation. It may therefore be inferred that the virus was not present in the chick, or at least it was not present in sufficiently high dilution to produce symptoms in mice.

In order to determine the effect of the virus on the hatched chicks, tests were made with filtered and unfiltered virus. A suspension of the virus contained in three mouse brains was prepared. A portion of this was subjected to low-speed centrifugation, followed by filtration through a Berkefeld filter and high-speed centrifugation. One group of five 3-day-old chicks was inoculated with unfiltered suspension of the virus, another group of 5 with the high-speed centrifugate, and a third group of 3 with the same volume of buffered salt solution. The virus used for inoculating the chicks was titrated on mice, using a dose half as large as that used for the chicks. These mice developed typical symptoms and died on the sixth day. None of the chicks showed any symptoms on the sixth day, and all continued to remain normal thereafter. Apparently, therefore, the virus was not virulent for the hatched chick, at least not with the doses used.

MICROSCOPICAL STUDIES

Impression smears of the membranes and organs of the embryos and preparations from the high-speed centrifugate of the filtrate of mouse and embryo brains stained with Giemsa and Victoria blue (*3*) failed to reveal the presence of any definitely formed bodies resembling elementary bodies, nor were any inclusion bodies observed.

SUMMARY

The virus of lymphocytic choriomeningitis was cultivated through eight passages in the chorio-allantoic membrane and in the brain of the chick embryo.

The chick embryos inoculated with virus survived longer than mice inoculated with the virus, indicating greater resistance on the part of the embryo to the virus.

The virus was present to approximately the same extent in the membrane and the brain of the embryo. It was also present in the liver and the amniotic fluid.

The lesion produced at the site of inoculation was relatively insignificant.

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(3) Herzberg, K.: Viktoriablau zur Färbung von filtrierbaren Virus (Pocken-, Varizellen-, Ektromelia- und Kanarienvogelvirus). Zentralbl. Bakt., Orig., 131: 358–366 (1934).

HISTOPATHOLOGIC REACTION TO THE VIRUS OF LYMPHOCYTIC CHORIOMENINGITIS IN THE CHICK EMBRYO

By R. D. Lillie, *Surgeon, United States Public Health Service*

Following the same plan as that described in the previously reported study on the reaction in the chick embryo to the virus of Rocky Mountain spotted fever (*1*, *2*), tissues were studied from nine chick embryos from the concurrently reported experiments of Bengtson and Wooley (*3*).

The fetal membranes presented inconstantly an irregular edema and sparse to moderate irregular infiltration by pseudo-eosinophil leucocytes. Nodules of myelocytes more or less mixed with lymphocytes were present in most of the birds. Vascular proliferative reactions were absent.

The skin presented a variable amount of focal cellular infiltration, chiefly in the head region, in most of the animals. The infiltration was composed of variable proportions of pseudo-eosinophil leucocytes, myelocytes, and lymphocytes.

A focal infiltration by varying proportions of myelocytes, leucocytes, and lymphocytes was often seen in the buccopharyngeal mucosa. The mucosae of the esophagus and proventriculus usually showed no significant lesions, and those of the gizzard and intestines were regularly normal. The musculature and once the serosa of the gizzard showed a focal myelocyte infiltration in 3 of 6 birds, in 1 mixed with lymphocytes.

The lungs usually showed an interstitial and perivascular infiltration by myelocytes, sometimes mixed with polymorphonuclear leucocytes, sometimes with lymphoid cells.

The heart showed a slight focal infiltration, by lymphocytes in 3 birds, by myelocytes in 1, and by polymorphonuclears in 1. The remaining 4 hearts were normal.

The liver in 3 birds was normal. In 4 it showed a slight to moderate periportal myelocyte infiltration, mixed with leucocytes in one and with lymphoid cells in another. In 2 birds a slight to moderate periportal myelocyte or myelocyte and lymphocyte infiltration was accompanied by focal necroses in the parenchyma, composed of shrunken oxyphil coagulated karyolytic liver cells in the one and of cell debris and fragmenting leucocytes and red corpuscles in the other

The pancreas regularly showed a slight to moderate interstitial myelocyte infiltration, mixed in 2 of 6 birds with polymorphonuclears.

The kidneys and Wolffian bodies were usually normal, a few foci of interstitial myelocyte or myelocyte and leucocyte infiltration occurring in the metanephros and mesonephros in one bird each, respectively.

The spleen pulp and the bone marrow were usually packed with granular myelocytes. In 4 birds from the later passage generations there was a variable admixture ranging up to predominance of polymorphonuclear leucocytes.

Splenic ellipsoids were sometimes prominent, and in later passage generations a moderate to marked pulp reticulo-endotheliosis with erythrophagia and hemosiderosis was noted.

In one bird a focal myelocyte infiltration of the chorioid plexus was present. In another, focal hemorrhage and polymorphonuclear infiltration were noted in the cranial arachnoidal mesenchyme. Otherwise there were no lesions in the brain, cord, cranial, and spinal root ganglia, chorioid plexus, or meninges.

Generally the reaction is of minor grade and not particularly specific, bearing little resemblance to that seen in mice (*4*) or monkeys (*4*, *5*). There seems to be an increased tendency to maturation of myeloid collections toward polymorphonuclear leucocytes, and in the fetal membranes the latter is often the predominating reacting cell type.

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REPORTING PARALYTIC AND NONPARALYTIC POLIOMYELITIS

Massachusetts Public Health Council Requires Differentiation Beginning January 1, 1936

By a recent vote of the Massachusetts Public Health Council it was determined that, effective January 1, 1936, all cases of anterior poliomyelitis in that State shall be reported as "paralytic" or "nonparalytic (preparalytic)" infections. This action was taken in order to obtain, so far as possible, a true picture of the current prevalence of the disease as contrasted with former years when the nonparalytic cases were not reported to the same extent as they are at the present time.

In the future all reports made by the Department of Public Health of Massachusetts will be in accordance with the classification above mentioned, and supplemental reports will be filed as cases reported as preparalytic subsequently develop paralytic signs, and the change in the classification therefore becomes necessary.

DEATHS DURING WEEK ENDED DEC. 21, 1935

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 21, 1935	Corresponding week, 1934
Data from 86 large cities of the United States:		
Total deaths	8,814	9,091
Deaths per 1,000 population, annual basis	12.3	12.7
Deaths under 1 year of age	550	585
Deaths under 1 year of age per 1,000 estimated live births	50	55
Deaths per 1,000 population, annual basis, first 51 weeks of year	11.4	11.3
Data from industrial insurance companies:		
Policies in force	67,826,231	67,079,418
Number of death claims	13,014	13,066
Death claims per 1,000 policies in force, annual rate	10.0	10.2
Death claims per 1,000 policies, first 51 weeks of year, annual rate	9.5	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Dec. 28, 1935, and Dec. 29, 1934

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 28, 1935, and Dec. 29, 1934

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec 28, 1935	Week ended Dec. 29, 1934	Week ended Dec 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934
New England States:								
Maine	------	------	2	2	129	3	0	1
New Hampshire	------	------	------	------	25	24	0	0
Vermont	------	1	------	------	169	2	0	0
Massachusetts	15	17	------	------	122	112	3	1
Rhode Island	1	6	------	------	42	6	1	0
Connecticut	1	1	6	81	48	278	0	0
Middle Atlantic States:								
New York	39	38	[1] 19	[1] 76	444	378	8	2
New Jersey	16	33	8	360	27	48	3	2
Pennsylvania	31	42	------	------	150	815	4	1
East North Central States:								
Ohio	47	97	11	360	60	435	3	7
Indiana	36	39	45	50	1	211	6	1
Illinois	52	73	35	57	22	1,056	11	7
Michigan	11	16	------	8	16	101	2	2
Wisconsin	2	6	55	25	84	369	1	4
West North Central States:								
Minnesota	------	13	------	------	32	298	1	0
Iowa	12	7	------	2	2	917	3	0
Missouri	33	37	97	80	12	213	2	3
North Dakota	------	16	------	32	1	126	1	1
South Dakota	2	------	1	------	2	18	3	0
Nebraska	2	11	------	------	65	44	0	3
Kansas	15	9	1	3	7	327	1	2
South Atlantic States:								
Delaware	1	3	------	4	28	2	0	0
Maryland [3]	8	7	8	115	39	42	4	0
District of Columbia	17	5	------	3	------	4	4	1
Virginia	47	30	------	------	50	112	4	2
West Virginia	11	29	113	13	8	237	4	0
North Carolina [3]	22	17	12	164	2	508	1	1
South Carolina	3	5	162	1,086	------	8	1	0
Georgia [4]	18	20	86	581	------	9	2	2
Florida	6	10	2	1	2	7	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 28, 1935, and Dec. 29, 1934—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934
East South Central States:								
Kentucky	33	36	10	23	12	140	7	1
Tennessee	16	32	63	79	1	11	1	0
Alabama [4]	26	28	110	258	8	174	0	4
Mississippi [3]	7	8					1	1
West South Central States:								
Arkansas	9	15	36	16		18	1	0
Louisiana [4]	23	10	13	6	21	23	1	1
Oklahoma [5]	12	17	111	123		4	11	1
Texas [4]	110	67	324	208	15	32	13	1
Mountain States:								
Montana	4	10	7	5	5	68	0	0
Idaho					21	3	0	1
Wyoming		2	2		1	5	0	0
Colorado	6	12			9	309	0	1
New Mexico	3	3	3	1	3	31	0	1
Arizona	3	1	51	32		16	1	1
Utah [3]	1			4	4	16	0	0
Pacific States:								
Washington		1		1	174	69	2	1
Oregon	3	1	36	74	310	13	0	0
California	40	48	40	42	217	66	3	5
Total	744	888	1,469	3,975	2,390	7,703	115	62
52 weeks of year	38,034	40,516	118,416	67,590	721,872	728,654	5,591	2,295

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934
New England States:								
Maine	2	0	26	18	0	0	3	4
New Hampshire	0	0	12	19	0	0	0	1
Vermont	0	0	5	17	0	0	0	0
Massachusetts	3	0	236	145	0	0	2	2
Rhode Island	2	0	23	12	0	0	0	0
Connecticut	1	0	50	46	0	0	0	1
Middle Atlantic States:								
New York	2	1	485	450	0	0	12	7
New Jersey	6	1	137	104	0	0	4	4
Pennsylvania	5	1	302	361	0	0	12	7
East North Central States:								
Ohio	0	2	365	805	3	1	2	4
Indiana	0	0	168	202	5	0	0	7
Illinois	3	1	499	610	5	4	4	11
Michigan	0	0	201	276	3	1	1	0
Wisconsin	0	0	416	375	16	19	2	0
West North Central States:								
Minnesota	0	1	254	106	17	6	1	1
Iowa	2	0	141	64	2	0	0	4
Missouri	0	0	121	57	4	0	4	9
North Dakota	0	1	81	69	5	4	1	0
South Dakota	0	0	35	13	8	5	1	0
Nebraska	0	1	170	30	61	10	0	0
Kansas	0	0	116	67	17	2	0	2
South Atlantic States:								
Delaware	0	0	5	7	0	0	0	0
Maryland [3]	1	0	56	101	0	0	12	1
District of Columbia	0	1	14	28	0	0	3	1
Virginia	1	0	48	86	0	0	5	7
West Virginia	0	0	77	125	0	0	2	1
North Carolina [3]	1	0	53	42	0	0	6	11
South Carolina	0	0	9	8	0	1	0	5
Georgia [4]	0	0	27	16	0	0	3	7
Florida	0	2	9	16	0	1	1	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 28, 1935, and Dec. 29, 1934—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 28, 1935	Week ended Dec 29, 1934	Week ended Dec. 28, 1935	Week ended Dec 29, 1934	Week ended Dec 28, 1935	Week ended Dec. 29, 1934	Week ended Dec. 28, 1935	Week ended Dec. 29, 1934
East South Central States								
Kentucky	0	0	53	57	0	0	3	4
Tennessee	0	0	36	61	0	2	5	5
Alabama [4]	4	0	11	12	0	1	7	10
Mississippi [2]	0	1	11	17	0	0	3	4
West South Central States								
Arkansas	1	1	8	12	0	5	8	10
Louisiana [4]	0	0	14	22	0	4	4	11
Oklahoma [5]	0	2	31	46	0	1	12	12
Texas [4]	2	1	117	50	1	5	9	19
Mountain States								
Montana	0	0	243	10	14	0	0	0
Idaho	0	0	53	2	1	0	0	0
Wyoming	0	0	86	13	2	4	1	0
Colorado	0	0	143	179	2	1	0	0
New Mexico	0	0	50	17	0	0	4	2
Arizona	0	1	13	14	0	0	0	4
Utah [2]	0	0	83	53	0	0	0	0
Pacific States								
Washington	0	0	66	27	23	29	1	2
Oregon	0	2	48	62	1	1	1	0
California	4	26	234	170	3	6	10	5
Total	40	46	5,391	5,099	193	113	149	187
52 weeks of year	10,733	7,276	251,583	214,614	7,490	5,142	17,491	21,032

[1] New York City only
[2] Week ended earlier than Saturday
[3] Rocky Mountain spotted fever, week ended Dec 28, 1935, North Carolina, 1 case
[4] Typhus fever, week ended Dec 28, 1935, 27 cases, as follows Georgia, 10, Alabama, 5, Louisiana, 4; Texas, 8
[5] Exclusive of Oklahoma City and Tulsa

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1935										
Hawaii Territory	1	7	13				1	1	0	2
November 1935										
California	17	240	157	13	656	4	41	1,063	17	44
Louisiana	7	118	83	165	40	15	6	55	0	42
Montana	7	8	50		60		2	553	199	3
New Hampshire		1					2	42	0	
Oklahoma [1]	11	99	298	186	5	12	3	110	5	50
Oregon	3	9	114	1	1,014		22	265	0	9
Virginia	8	301	261	17	116	5	8	301	0	43
Washington	9	15	27		400		5	332	145	8

[1] Exclusive of Oklahoma City and Tulsa.

October 1935

	Cases
Hawaii Territory:	
Chicken pox	28
Epidemic encephalitis	1
Leprosy	2
Mumps	37
Typhus fever	9
Whooping cough	40

November 1935

	Cases
Actinomycosis:	
California	1
Anthrax:	
California	1
Louisiana	1
Botulism:	
California	3
Chicken pox:	
California	1,372
Louisiana	9
Montana	173
Oklahoma [1]	31
Oregon	224
Virginia	284
Washington	470
Conjunctivitis:	
Montana	3
Dysentery:	
California (amoebic)	9
California (bacillary)	9
Louisiana (amoebic)	8
Louisiana (bacillary)	7
Oklahoma [1]	15
Virginia (amoebic)	2
Virginia (unspecified, diarrhea included)	72
Washington (bacillary)	1
Epidemic encephalitis:	
California	5
Montana	2
Oregon	3
Virginia	1
Washington	1
Food poisoning:	
California	8

November 1935—Continued

	Cases
German measles:	
California	287
Montana	4
Washington	87
Granuloma, coccidioidal:	
California	1
Hookworm disease:	
California	1
Louisiana	14
Impetigo contagiosa:	
Montana	47
Oklahoma [1]	9
Oregon	132
Washington	3
Jaundice, epidemic:	
California	1
Mumps:	
California	902
Louisiana	7
Montana	605
Oklahoma [1]	45
Oregon	109
Virginia	94
Washington	406
Ophthalmia neonatorum:	
California	1
Oklahoma [1]	1
Paratyphoid fever:	
California	3
Louisiana	1
Oregon	3
Virginia	2
Washington	1
Psittacosis:	
California	3
Rabies in animals:	
California	29
Louisiana	7
Oregon	2
Washington	2
Rabies in man:	
Virginia	1
Rocky Mountain spotted fever:	
Virginia	1

November 1935—Continued

	Cases
Scabies:	
Montana	1
Oklahoma [1]	1
Oregon	47
Septic sore throat:	
California	9
Louisiana	1
Montana	15
Oklahoma [1]	73
Oregon	9
Virginia	12
Washington	10
Tetanus:	
California	5
Louisiana	7
Oklahoma [1]	1
Virginia	2
Trachoma:	
California	18
Lousiana	1
Oklahoma [1]	6
Virginia	1
Washington	30
Trichinosis: California	6
Tularemia:	
California	1
Montana	2
Virginia	15
Typhus fever:	
California	2
Virginia	1
Undulant fever:	
California	2
Louisiana	7
Virginia	3
Vincent's infection:	
Oklahoma [1]	1
Oregon	13
Virginia	1
Whooping cough:	
California	521
Louisiana	39
Montana	25
Oklahoma [1]	9
Virginia	112
Washington	71

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 21, 1935

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet-fever cases	Smallpox cases	Tuberculosis deaths	Typhoid-fever cases	Whooping-cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	1	0	1	2	1	0		0	12	21
New Hampshire:											
Concord	0		0	0	0	1	0	1	0	0	11
Manchester	0		0	0	0	5	0	0	0	0	21
Nashua	0			0		0	0		0	0	
Vermont:											
Barre	0		0	0	0	0	0	0	0	0	2
Burlington	0		0	0		0	0		0	0	9
Rutland	0		0	0	2	1	0	1	0	0	7
Massachusetts:											
Boston	2		2	35	29	63	0	11	0	11	243
Fall River	1		0	0	3	1	0	1	0	0	31
Springfield	0		0	3	3	8	0	0	0	21	36
Worcester	0		0	0	2	28	0	1	0	6	41
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	16
Providence	0		0	10	8	15	0	2	0	11	84
Connecticut:											
Bridgeport	1	5	2	0	2	1	0	0	0	3	37
Hartford	2		0	0	4	2	0	0	0	12	37
New Haven	0	1	1	0	2	1	0	0	0	13	54

[1] Exclusive of Oklahoma City and Tulsa.

City reports for week ended Dec. 21, 1935—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet-fever cases	Smallpox cases	Tuberculosis deaths	Typhoid-fever cases	Whooping-cough cases	Deaths, all causes
		Cases	Deaths								
New York:											
Buffalo	0	---	0	19	27	39	0	6	0	4	155
New York	40	13	8	128	166	167	0	86	1	101	1,516
Rochester	0	---	0	1	4	1	0	1	0	1	80
Syracuse	0	---	0	2	3	2	0	1	0	14	45
New Jersey											
Camden	0	---	0	1	5	1	0	0	0	0	31
Newark	0	5	1	2	9	46	0	6	0	29	111
Trenton	0	---	0	0	3	9	0	4	0	2	45
Pennsylvania											
Philadelphia	5	5	3	86	42	92	0	19	2	77	534
Pittsburgh	4	2	4	22	28	63	0	6	0	27	187
Reading	0	---	0	1	3	0	0	2	0	0	23
Scranton	1	---	---	4	---	2	0	---	0	0	---
Ohio:											
Cincinnati	9	---	3	1	18	20	0	3	0	0	100
Cleveland	7	40	3	7	21	28	0	12	0	47	186
Columbus	7	3	3	1	9	7	0	2	0	6	90
Toledo	0	4	1	25	8	18	0	2	0	7	82
Indiana											
Anderson	0	---	0	1	2	1	0	1	0	5	8
Fort Wayne	5	---	0	0	3	10	2	1	0	0	35
Indianapolis	1	---	1	2	23	35	0	4	0	16	133
South Bend	0	---	0	0	1	2	0	0	0	0	13
Terre Haute	0	---	0	0	0	0	0	0	0	0	25
Illinois											
Alton	4	---	0	0	4	2	1	0	1	0	13
Chicago	16	11	1	10	58	197	0	35	1	113	757
Elgin	1	---	0	0	1	0	0	0	0	0	10
Moline	0	---	0	0	0	8	0	0	0	1	2
Springfield	0	---	0	0	2	4	0	0	0	2	15
Michigan											
Detroit	4	---	4	4	37	81	0	21	0	112	280
Flint	8	---	0	2	4	17	0	0	0	2	23
Grand Rapids	0	---	0	1	3	20	0	0	0	6	38
Wisconsin											
Kenosha	0	---	0	0	0	7	0	1	0	1	9
Milwaukee	0	2	2	3	10	62	0	2	1	91	109
Racine	0	---	0	2	2	7	0	0	0	5	23
Superior	0	---	1	1	0	5	0	0	0	0	9
Minnesota:											
Duluth	0	---	0	0	3	1	0	0	0	10	17
Minneapolis	1	---	1	10	15	108	0	1	0	12	122
St. Paul	0	---	0	14	9	44	0	1	0	3	74
Iowa:											
Cedar Rapids	0	---	---	0	---	2	0	---	0	2	---
Davenport	0	---	---	0	---	9	0	---	0	0	---
Des Moines	4	---	---	0	5	5	2	1	0	0	50
Sioux City	0	---	---	0	---	2	0	---	0	0	---
Waterloo	4	---	---	0	---	6	0	---	0	2	---
Missouri:											
Kansas City	5	1	0	1	12	12	0	6	0	1	87
St. Joseph	3	---	0	0	0	3	0	0	0	1	---
St. Louis	19	---	2	0	19	48	0	7	3	0	210
North Dakota:											
Fargo	0	---	0	3	0	16	0	0	0	0	6
Grand Forks	0	---	---	0	---	0	0	---	0	0	---
Minot	0	---	---	0	---	6	0	---	0	0	7
South Dakota:											
Aberdeen	0	---	---	0	---	1	0	---	0	0	---
Nebraska:											
Omaha	5	---	1	2	5	164	6	2	0	0	53
Kansas:											
Lawrence	0	---	0	0	0	0	0	0	0	0	3
Topeka	0	---	0	0	3	7	0	0	0	1	26
Wichita	1	---	0	1	3	9	0	1	0	0	21
Delaware:											
Wilmington	0	---	0	0	5	2	0	2	0	2	28
Maryland:											
Baltimore	6	4	2	2	17	34	0	9	6	17	201
Cumberland	1	1	1	0	1	4	0	0	0	0	17
Frederick	0	---	0	0	0	0	0	0	0	0	2
District of Columbia:											
Washington	24	1	1	1	22	10	0	12	0	1	187

City reports for week ended Dec. 21, 1935—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Virginia:											
Lynchburg	2	------	2	0	2	4	0	2	0	8	14
Norfolk	0	------	0	0	6	5	0	3	0	0	39
Richmond	0	------	1	0	5	4	0	3	1	1	50
Roanoke	0	------	0	0	1	0	0	0	0	0	19
West Virginia:											
Charleston	0	1	1	0	0	4	0	0	0	0	8
Wheeling	0	------	0	5	6	4	0	1	0	0	22
North Carolina:											
Gastonia	1	------	0	0	1	1	0	0	0	0	1
Raleigh	------	------	------	------	------	------	------	------	------	------	------
Wilmington	2	------	0	0	2	1	0	0	0	1	18
Winston-Salem	8	3	2	0	0	3	0	0	0	0	9
South Carolina:											
Charleston	1	20	2	0	3	2	0	1	0	2	24
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	1	0	0	0	0	0	6
Greenville	0	------	0	1	1	0	0	0	0	0	5
Georgia:											
Atlanta	1	33	2	1	12	16	0	2	0	0	82
Brunswick	0	------	0	0	2	0	0	0	0	0	6
Savannah	3	13	1	0	7	1	0	1	1	0	50
Florida:											
Miami	5	2	1	0	2	0	0	4	0	0	45
Tampa	1	1	1	0	2	2	0	2	0	0	23
Kentucky:											
Ashland	0	------	------	0	------	1	0	------	0	0	------
Covington	1	1	0	0	0	5	0	0	0	0	17
Louisville	2	------	0	1	11	8	0	0	0	0	67
Tennessee:											
Knoxville	4	3	0	0	1	1	0	3	1	0	17
Memphis	4	------	1	0	9	6	0	3	0	2	80
Nashville	2	------	4	0	13	5	0	1	0	0	66
Alabama:											
Birmingham	3	8	3	1	10	2	0	3	0	0	61
Mobile	0	2	2	0	2	0	0	2	0	0	25
Montgomery	1	4	------	0	------	2	0	------	0	5	------
Arkansas:											
Fort Smith	0	------	------	0	------	1	0	------	0	0	------
Little Rock	1	------	0	1	13	2	0	2	0	0	17
Louisiana:											
New Orleans	0	------	8	6	14	2	0	10	1	7	185
Shreveport	0	------	0	0	5	2	0	3	1	0	32
Oklahoma:											
Oklahoma City	2	4	0	2	5	6	0	1	0	0	39
Texas:											
Dallas	9	3	3	0	6	8	0	4	0	0	75
Fort Worth	8	------	1	0	2	5	0	3	0	1	44
Galveston	7	------	0	0	4	2	0	0	0	0	17
Houston	7	------	1	2	12	2	0	2	0	0	96
San Antonio	1	------	3	0	8	2	0	0	0	0	57
Montana:											
Billings	0	------	1	0	0	9	0	0	0	0	9
Great Falls	0	------	0	0	0	4	0	1	0	5	11
Helena	0	------	0	0	0	1	0	0	0	0	2
Missoula	0	------	0	0	3	34	1	0	0	0	13
Idaho:											
Boise	0	------	0	0	0	4	0	1	0	0	4
Colorado:											
Colorado Springs	0	------	0	1	2	12	0	0	0	2	12
Denver	3	------	0	4	5	17	0	2	1	3	80
Pueblo	1	------	0	0	2	13	0	0	0	0	10
New Mexico:											
Albuquerque	------	------	1	1	1	14	0	2	0	0	12
Utah:											
Salt Lake City	0	------	0	0	3	45	0	1	0	5	35
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	10	------	18	0	------	0	2	------
Spokane	0	------	0	8	5	1	1	1	0	3	30
Tacoma	0	------	0	0	2	0	0	1	0	1	32
Oregon:											
Portland	0	3	0	59	4	19	0	1	0	3	66
Salem	0	------	------	0	------	2	0	------	0	0	------
California:											
Los Angeles	8	20	0	40	23	46	0	19	2	18	303
Sacramento	1	------	0	2	4	31	0	1	0	3	34
San Francisco	1	------	1	55	5	30	0	12	0	32	171

City reports for week ended Dec. 21, 1935—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	1	0
Worcester	2	1	1
Rhode Island:			
Providence	1	0	0
Connecticut:			
Bridgeport	1	0	0
New York:			
New York	9	5	3
Pennsylvania:			
Philadelphia	2	1	0
Pittsburgh	1	0	0
Scranton	1	0	0
Ohio:			
Cincinnati	1	0	0
Cleveland	2	0	0
Indiana:			
Indianapolis	1	1	0
Illinois:			
Chicago	0	1	0
Springfield	1	1	0
Michigan:			
Detroit	0	0	1
Wisconsin:			
Milwaukee	1	1	0
Minnesota:			
Minneapolis	1	0	0
Missouri:			
St. Joseph	2	0	0
St. Louis	2	1	0
Kansas:			
Wichita	0	0	1

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Maryland:			
Baltimore	8	6	0
District of Columbia:			
Washington	1	1	0
West Virginia:			
Wheeling	1	0	0
North Carolina:			
Wilmington	1	0	0
South Carolina:			
Charleston	1	0	0
Kentucky:			
Louisville	2	2	0
Tennessee:			
Knoxville	1	0	0
Alabama:			
Birmingham	1	0	0
Arkansas:			
Little Rock	2	1	0
Texas:			
Fort Worth	1	0	0
Colorado:			
Colorado Springs	1	0	0
Washington:			
Seattle	1		0
Spokane	2	1	0
Oregon:			
Portland	1	0	0
California:			
Los Angeles	1	1	1
Sacramento	1	1	0

Dengue.—Cases: Miami, 1.
Epidemic encephalitis.—Cases: Newark, 1; Trenton, 2; Toledo, 1; St. Louis, 1; New Orleans, 1.
Pellagra.—Cases: Boston, 1; Wilmington, N. C., 1; Winston-Salem, 1; Atlanta, 1; Savannah, 1; Montgomery, 1.
Typhus fever.—Cases: Atlanta, 2; New Orleans, 1; Dallas, 1; Fort Worth, 2.

FOREIGN AND INSULAR

BELGIUM

Vital statistics—1934.—Following are vital statistics for Belgium for the year 1934:

	Number	Rate per 1,000 inhabitants
Population	8,275,552	
Marriages	62,692	7.58
Live births	132,568	16.02
Deaths	100,731	12.17

CANADA

Provinces—Communicable diseases—2 weeks ended December 14, 1935.—During the 2 weeks ended December 14, 1935, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	2	1			1	5
Chicken pox		74	15	481	1,050	225	68	40	258	2,206
Diphtheria		3	15	76	28	6	8	1	1	138
Erysipelas				12	6	4	2	4	4	32
Influenza		13	1		28				4	46
Lethargic encephalitis						1				1
Measles		62	231	547	1,677	53	440	84	458	3,552
Mumps		60			842	26[illegible]	908	12	204	2,287
Paratyphoid fever					1					1
Pneumonia	2				16		3		7	28
Poliomyelitis				1				1		2
Scarlet fever		13	5	294	632	102	41	59	56	1,202
Smallpox									2	2
Trachoma									11	11
Tuberculosis	1	10	11	82	90	14	11	2	13	234
Typhoid fever			3	79	7	3			1	93
Undulant fever				1	6					7
Whooping cough		77	3	267	421	55	62	5	6	896

CZECHOSLOVAKIA

Communicable diseases—October 1935.—During the month of October 1935, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	7		Paratyphoid fever	19	
Cerebrospinal meningitis	11	5	Poliomyelitis	45	2
Chicken pox	276		Puerperal fever	64	31
Diphtheria	2,933	146	Scarlet fever	3,847	40
Dysentery	355	38	Trachoma	130	
Influenza	53	1	Typhoid fever	597	48
Lethargic encephalitis	2	2	Typhus fever	18	2
Malaria	33				

YUGOSLAVIA

Communicable diseases—November 1935.—During the month of November 1935, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	57	7	Poliomyelitis	3	
Cerebrospinal meningitis	3		Scarlet fever	1,028	13
Diphtheria and croup	1,183	110	Sepsis	9	7
Dysentery	512	60	Tetanus	43	23
Erysipelas	370	20	Typhoid fever	766	71
Measles	713	2	Typhus fever	10	2
Paratyphoid fever	45				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for December 27, 1935, pages 1834–1848. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued January 31, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India—Negapatam.—During the week ended December 21, 1935, 4 cases of cholera were reported at Negapatam, India.

Siam—Lopburi Province.—During the week ended December 21, 1935, 9 cases of cholera were reported in Lobpuri Province, Siam.

Plague

Egypt—Minya.—During the week ended December 21, 1935, 1 death from plague was reported at Minya, Egypt.

Hawaii Territory—Hawaii Island—Hamakua District—Hamakua Mill Sector.—On December 23, 1935, 1 plague-infected rat was reported in Hamakua Mill Sector, Hamakua District, Hawaii Island, Hawaii Territory.

Typhus Fever

Iraq.—During the week ended December 14, 1935, 17 cases of typhus fever with 6 deaths were reported in Iraq.

Yellow Fever

Ivory Coast—Abidjan.—During the week ended December 21, 1935, 1 case of yellow fever was reported at Abidjan, Ivory Coast.

Senegal—Dakar.—Information dated December 17, 1935, states that 1 suspected case of yellow fever with 1 death was reported at Dakar, Senegal, being imported from M'Backe, Baol Circle, Senegal.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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PUBLIC HEALTH REPORTS

VOL. 51 — JANUARY 17, 1936 — No. 3

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

December 1-28, 1935

Meningococcus meningitis.—The relatively high incidence of meningococcus meningitis which has prevailed in the United States throughout the year was maintained during the current period. For the 4 weeks ended December 28 the number of cases reported was 436, as compared with 202, 172, 241, and 280 for the corresponding period in the years 1934, 1933, 1932, and 1931, respectively. For the country as a whole the incidence has been the highest since 1930. During two 4-week periods earlier in the year the incidence exceeded that for the corresponding periods in 1930, and the number of cases for the current period was about 15 percent in excess of the figure for this period in that year. At no time, however, has the incidence reached the high level of 1929.

Table 1 gives for each geographic area the number of cases reported in 4-week periods during the current year, with comparative data for the years 1934 and 1933. The table shows that all sections of the country have contributed to the high incidence of the current year. The sharpest rise during the 4 weeks ended December 28 over the preceding 4-week period was reported from the South Central sections. Of a total of 138 cases, as against 50 for the preceding period in those sections, Oklahoma reported 54, Texas 36, Kentucky 16, and Tennessee 12. The incidence was the highest in this area in the 7 years for which data are available. Several States contributed to the highest incidence in 7 years in the South Atlantic area also. In other regions the increases were more normal. The seasonal peak of meningitis is not usually reached until March or April; further increases therefore may be expected up until that time.

[1] From the Office of Statistical Investigations, U. S. Public Health Service. These summaries include only the eight important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers. The numbers of States included for the various diseases are as follows: Typhoid fever, 48; poliomyelitis, 48, meningococcus meningitis, 48; smallpox, 48; measles, 47; diphtheria, 48; scarlet fever, 48; influenza, 44 States and New York City The District of Columbia is counted as a State in these reports.

Table 1.—*Meningococcus meningitis cases reported in each geographic area during 1935, 1934, and 1933*

Geographic area and year	52 weeks	4-week period ended— Apr. 20 [1]	May 18	June 15	July 13	Aug. 10	Sept. 7	Oct. 5	Nov. 2	Nov. 30	Dec. 28
All sections.[2]											
1935	5,599	659	706	568	392	292	268	240	273	298	436
1934	2,303	249	220	178	134	130	129	135	135	129	202
1933	2,839	340	230	202	145	147	120	130	125	157	172
New England and Middle Atlantic:											
1935	1,171	127	145	136	109	87	66	96	68	89	69
1934	463	26	41	42	28	30	28	28	26	33	44
1933	590	72	39	44	34	48	45	27	25	39	38
East North Central:											
1935	1,305	189	195	128	92	67	57	35	57	69	78
1934	641	83	59	54	42	36	39	44	37	27	44
1933	877	115	89	79	51	30	28	29	32	41	45
West North Central.											
1935	630	75	83	62	27	30	26	17	33	32	41
1934	292	35	34	28	12	14	21	18	15	15	27
1933	345	40	34	25	13	16	12	9	6	17	18
South Atlantic:											
1935	1,045	108	150	121	77	48	66	30	59	40	69
1934	265	41	21	13	16	10	12	17	10	22	25
1933	327	30	17	16	15	16	15	26	22	27	33
East and West South Central											
1935	911	101	68	63	49	52	29	41	35	50	138
1934	414	35	51	28	15	19	18	20	29	18	35
1933	443	56	35	21	20	25	14	27	22	20	19
Mountain and Pacific [3]											
1935	537	59	54	58	38	28	24	21	27	39	41
1934	228	19	14	13	28	12	11	8	18	14	27
1933	257	27	16	17	12	12	15	13	18	13	19

[1] See Public Health Reports for Oct. 25, 1935, p 1487, for data for preceding 4-week periods.
[3] Nevada excluded· no data.

Poliomyelitis.—All sections of the country reported the usual seasonal decline of poliomyelitis during the current period, but the incidence was still considerably above the level of the corresponding period in each of the 3 preceding years. For the 4 weeks ended December 28 the number of cases reported totaled 232. In 1931 and 1930 the numbers for this period were 266 and 332, respectively. While each geographic area reported a decline from the preceding 4-week period, only the East North Central, Mountain, and Pacific areas reported fewer cases than at this time last year. In the New England and Middle Atlantic sections the number of cases (107) was almost seven times the figure for last year; in the West North Central the number (14) was double that for last year; while the South Atlantic region and the South Central regions reported increases of 70 and 50 percent, respectively.

Smallpox.—For the 4 weeks ended December 28 a total of 805 cases of smallpox was reported. The disease was still unusually prevalent in Nebraska (192 cases), Montana (140 cases), Washington State (121 cases), Colorado (53 cases), South Dakota (50 cases), and Kansas (41 cases). More than three-fourths of the total number of cases occurred in those States, which were mostly responsible for the highest incidence for the country as a whole since 1931. One case was

reported from the Middle Atlantic group of States (New York) and two cases were reported from the South Atlantic section. In the East North Central and South Central sections the incidence was the lowest in recent years.

Influenza.—The number of cases of influenza rose from about 3,500 for the preceding 4 weeks to approximately 5,500 for the current 4-week period. All sections of the country contributed to the increase, which, however, seemed to be about normal for this season of the year. Compared with preceding years the current incidence was about 60 percent of that for the corresponding period last year, but it was about 10 percent above the figure for the same period in 1933. In 1932 an epidemic was in progress in the West and South and 157,864 cases were reported for this period.

Typhoid fever.—The number of cases of typhoid fever reported for the 4 weeks ended December 28 was 752, as compared with 1,039, 995, and 680 for the corresponding period in the years 1934, 1933, and 1932, respectively. Each geographic area reported the lowest incidence since 1932, and in the New England, Middle Atlantic, and East North Central regions the incidence was the lowest in the 7 years for which data are available. Among the South Atlantic States the number (152 cases) was the lowest in 6 years. For the country as a whole typhoid fever has been less prevalent throughout the entire current year than in 1934.

Measles.—Reports indicate a normal seasonal increase of measles during the current 4-week period. The total number of reported cases was 10,802, as compared with 30,920 and 20,496 for the corresponding period in the years 1934 and 1933, respectively. During the year 1934 and the first half of the current year measles was unusually prevalent, but during recent weeks the disease declined rapidly and the current incidence compares more favorably with the more normal years of 1932, 1931, and 1930, when 13,942, 14,377, and 12,757 cases, respectively, were reported for this period. During the 1933–34 outbreak of measles the highest incidence was reported from the South Atlantic, South Central, Mountain, and Pacific sections, while in the 1934–35 outbreak the disease was most prevalent in the New England and Middle Atlantic and North Central sections. These sections were, however, not totally unaffected by the 1933–34 outbreak as the South Atlantic and South Central sections seem to have been by the current one. The incidence has been slightly above the expectancy in the Mountain and Pacific sections, the only regions where the current incidence exceeded that for the corresponding period of last year.

Scarlet fever.—The reported current incidence of scarlet fever was the highest for this period in the 7 years for which data are available. For the 4 weeks ended December 28 the reports show 24,405 cases.

In the West North Central section, where the disease has been unusually prevalent throughout the current year, the number of cases (4,323) was 2.4 times the figure for the corresponding period of last year, and in the Mountain and Pacific section, where the number of cases has also been considerably above the expectancy, the current incidence (4,004 cases) represented more than a 50-percent increase over the incidence at this time last year. The South Central area followed the level of last year very closely, as did also the East North Central and South Atlantic regions during the last half of the year. The New England and Middle Atlantic section reported about a 30-percent increase for the current period over the incidence of last year, but throughout the year the incidence has compared very favorably with that of last year.

Diphtheria.—The diphtheria incidence continued to follow the level of 1934 very closely. During the current 4-week period 3,861 cases were reported, as compared with 4,013 for the corresponding period last year. For this period in 1933 and 1932 the numbers of cases totaled 5,150 and 4,594, respectively. The New England and Middle Atlantic region reported a decrease of about 15 percent from the figure for the corresponding period of last year, but in other sections the incidence was about the same as last year.

Mortality, all causes.—The average mortality rate from all causes in large cities for the 4 weeks ended December 28, as reported by the Bureau of the Census, was 12.3 per 1,000 inhabitants (annual basis). The rates for the separate weeks of the period were 12.5, 12.3, 12.1, and 12.2, respectively. The rates for the first 2 weeks were considerably above those for the corresponding weeks in 1934 and the last 2 were slightly below those of last year, but the average rate for the period was approximately the same as that for the corresponding period in each of the 2 preceding years. During this period in 1932 a minor influenza epidemic was in progress and the rate was 13.4.

EFFECT OF CERTAIN BACTERIAL PRODUCTS UPON THE GROWTH OF MOUSE TUMOR

By L. C. Fogg, *Cytologist, United States Public Health Service, Office of Cancer Investigations, Harvard Medical School*

INTRODUCTION

It is well known that bacterial products are capable of modifying the growth of tumor. The regression, or complete recession, of tumors in subjects recovering from an attack of an acute infection, such as erysipelas, has been too frequently reported not to be significant. A number of investigators, too, such as Lassar, Spronck, Coley, Beebe

and Tracy, Uhlenhuth, Haendel and Steffenhagen, and Beck, have investigated the action of bacterial products upon malignant tumors either in laboratory animals or upon human subjects.

More recent reports have been made by Gratia and Linz (1931), by Shwartzman (1932), by Duran-Reynals, and by Apitz (1933). Because of their relation to the observations reported herewith they will be briefly described.

Gratia and Linz reported that when guinea pigs bearing a transplantable liposarcoma were intravenously injected with the filtered broth from a culture of *B. coli*, extensive and diffuse hemorrhages took place in the tumors. This observation was made in the course of a study of the so-called "Shwartzman reaction." Shwartzman, impressed by their report, studied the action of a meningococcus filtrate given intravenously or intraperitoneally to mice bearing mouse sarcoma 180. This material also produced severe and diffuse hemorrhages in the tumors. In a series of 40 tumor-bearing mice so treated, there were 9, or 22½ percent, with complete recession and 2 others died which were tumor-free at death. Shwartzman felt that some importance should be attached to this proportion of recoveries in the case of a tumor of the known growth energy of sarcoma 180.

The problem was further studied in 1933 by Duran-Reynals, who tested the action of a *B. coli* filtrate, given either intravenously or intraperitoneally, upon a variety of laboratory tumors in both rats and mice. As a result he classified his tumors into two groups; namely, those reacting positively and those reacting negatively to the injection. The positively reacting tumors were mouse sarcomas 37 and 180, the Walker rat sarcoma, mouse carcinoma 63, and the Twort mouse carcinoma. There were 169 mice and 34 rats in this group, a total of 203 animals. The group of negatively reacting tumors occurred in 69 rats and mice as follows: 19 mice with spontaneous mammary adenocarcinomas, 6 mice with the Hardy and Passey melanotic sarcoma, 4 mice bearing the transplantable Walker rat tumor, 10 rats bearing mouse sarcoma 37 or 180 (instances of heterologous transplantation), 20 mice with benign embryomas, and 10 mice with Kieselguhr granulomas. Complete recessions, in the first group, took place only in the mice bearing sarcomas 37 and 180. Duran-Reynals stresses that only those tumors showing both malignancy and rapid growth appeared to be affected by the injections.

Apitz made a study of hemorrhagic reactions produced by a *B. coli* filtrate, using the Ehrlich mouse carcinoma as the tumor. He found the hemorrhages to be located between an outer necrotic zone and an inner growth area around the base. He further noted that the tumor cells were affected with swelling and edema. Not only was Apitz able to produce these hemorrhages with a *B. coli* filtrate but also with agar solutions, antigen-antibody mixtures, and antihomo-

logous serum. It is of interest to note that the injection of a substance into tumor-bearing mice capable of producing a hemorrhagic diathesis (in this case, venom from the snake *Crotalus adamanteus*) did not cause hemorrhage in tumors. Apitz concluded that the cells were directly affected, as evidenced by the cellular swelling and edema.

EXPERIMENTAL

The experiments herewith reported resulted from a more or less fortuitous observation made while studying the liquefying properties, on the medium, of tumor cells of mouse sarcoma 180 grown in tissue culture. This work was often hampered by rapid and complete liquefaction of the tissue culture medium due to contamination with a small Gram-negative bacillus which made its appearance in the tissue cultures in spite of stringent aseptic technique. Investigation showed this organism, among others, to be saprophytic in a considerable proportion of the tumors propagated at this laboratory. (Thus in culture tests conducted on 97 tumors from which only pearly-white fragments aseptically removed were planted, the small Gram-negative bacillus was recovered from 56 tumors; 11 showed a small Gram-positive diplococcus and 2 showed *B. pyocyaneus*. Fragments from only 12 tumors yielded no growths.)

Impressed by the destructive effect upon the explant, which became rapidly opaque and necrotic on contamination of the tissue cultures with this bacillus, the experiment was made of injecting a small amount (0.2 cc) of the liquefied tissue culture medium containing the bacillus intravenously into mice bearing mouse sarcoma 180. Out of 67 mice so injected, 49, or 73 percent, died within a few hours as a result of the injection. In 14 mice the tumor was obviously affected, in 4 of which it completely receded.[1]

This led to a further study and identification of the organism, which was found to correspond with *B. proteus vulgaris* in most of its morphological and cultural characteristics (a small Gram-negative motile bacillus, with spreading growth on solid media, rapidly liquefying gelatin, fermenting with gas in dextrose but not in lactose).

The next set of experiments had to do with the testing of the effect of a heated suspension of the bacilli on mice bearing sarcoma 180. In these experiments the bacilli obtained either by centrifugation from broth cultures or washed with physiological salt solution from agar slants or from the agar surface in Kolle flasks were heated in the water bath to various temperatures and injected in from 0.1- to 0.2-cc doses in the tail veins of the mice. The results of these experiments are set forth in table 1.

[1] In a recent paper Shwartzman has noted a similar effect in mice injected with living *B. enteritidis* organism.

TABLE 1.—*Results of intravenous injection of vaccines into CR 180-bearing mice*

Treatment: Temperature °C.	Treatment: Minutes	Number of mice	Complete recession	Tumors affected but not destroyed	Tumors not affected	Number of mice dying
60	30	96	12	83	4	47
60	60	10	0	10	0	0
55-58	60	52	11	12	11	18
70	60	13	6	3	0	4
75	30	85	21	12	4	48
98	15	19	4	6	2	7
98	30	25	6	7	0	12
Total		300	60	83	21	136
Percent			20	—28	7	45

It is evident from a consideration of this table that the heated suspension produced a number of complete recessions (20 percent) sufficient to encourage further work. Moreover, in an additional 28 percent the tumor was affected, although not destroyed. The suspension had considerable toxicity, for 136 mice, or 45 percent, succumbed to the injection, although normal mice were found to withstand a similar dosage with but little effect. In all of the experiments tabulated, each mouse was subjected to several injections in amounts of 0.1 to 0.2 cc. A larger initial dose produced a greater effect on the tumor, but the mouse nearly always succumbed. For subsequent injections, an interval of at least 3 to 4 days was required to secure an additional effect upon the tumor. This is reminiscent of the experience of Uhlenhuth, Haendel, and Steffenhagen, who, in treating rats bearing the Bashford rat sarcoma with pyocyanase, found that an interval of 8 days between injections was required to secure the optimum effect. This series of experiments showed further that the activity of the suspension was not destroyed by heating to 98° C. for 15 minutes, a fact previously noted by Beebe and Tracy, who found that the activity of their bacterial suspensions was not destroyed even by boiling.

In addition to mouse sarcoma 180 the effect of the bacterial suspensions was tested upon a few mice bearing sarcoma 37, carcinoma M63, spontaneous mammary cancer in the "Agouti" strain, transplantable spontaneous mammary cancer in the homologous strain, and upon sarcomas induced by the injection of 1:2:5:6-dibenzanthracene. The results of these experiments are summarized in table 2.

TABLE 2.—*Summary of effect of heat-killed cultures on other tumors*

Tumor	Number of mice	Complete recession	Affected but not destroyed	Not affected	Number of mice dying
S-37	45	7	8	1	9
M-63	42	4	12	7	19
Spontaneous Agouti	6	0	4	0	2
Spontaneous carcinoma (1st generation transplant)	4	0	4	0	0
C_3H-DBA	9	0	4	0	5

The number of animals in this series is relatively low, 105 in all. In conformity with the experience of Duran-Reynals with the B. coli filtrate, the highest percentage of recessions was produced in sarcoma 37. It is worth noting that 4 complete recessions were produced in mice bearing carcinoma 63, although Duran-Reynals observed none in this variety of tumor. The toxic effect was most pronounced in the case of carcinoma 63. Though no spontaneous tumors in this small series were caused to recede, an effect was produced, as evidenced by inhibition of growth, decrease in size, and in one case hemorrhage followed by shrivelling, drying, and temporary arrest.

Means were sought to diminish the toxicity for tumor-bearing mice of the bacterial suspensions and thus to improve the results. An immune serum was made by injecting killed followed by living *proteus*-type organisms into two rabbits with the hope that this serum would protect mice from the toxic effects of the bacterial injection. By this method a serum of rather low agglutination titer (1:1000) was obtained. The rabbit serum was injected subcutaneously into the mice when they received the bacterial suspension. The results are summarized in table 3.

TABLE 3.—*Vaccine and serum treatment*

Tumor	Number of mice	Complete recession	Affected but not destroyed	Not affected	Number of mice dying
CR 180	84	26	32	6	20
Percent	--------	31	38	7	24

By the use of this serum, in the moderate number of mice used, the percentage of complete recessions was improved but the number of tumors in which complete recession could not be secured and the mortality from treatment were still high.

Attempts were next made to secure derivatives from the bacteria which would affect the tumors but would be less toxic to the mice. Some experiments were carried out with a product made by digesting the bacteria with trypsin, with a little chloroform or tricresol added as a preservative, and then filtering off the bacteria, either roughly through hard filter paper or with an N Berkefeld filter. The product was discarded after a few experiments because the tumors were much less affected than with the suspensions and the toxicity was high.

At the suggestion of Dr. L. D. Felton, of the Harvard Medical School, use was made of the alcohol-insoluble fraction of the bacteria. It had been previously noted by Beebe and Tracy that the active substance in bacterial products was present in alcohol-insoluble fractions. Also Shwartzman was able to evoke his reaction with the alcohol-insoluble fraction of *B. typhosus*.

The product used in these experiments was made in the following manner: A suspension of bacteria in physiological salt solution averaging 24 cc in volume was cytolized by the addition of 0.5 to 3 cc normal NaOH for times varying from 5 minutes to 1 hour. After centrifuging, the supernatant fluid was neutralized with HCl and 3 volumes of ethyl alcohol were added. As much of the resulting alcohol-insoluble precipitate as would dissolve in 0.9 percent NaCl solution was then used for injection. This method was used not only in the case of the *proteus*-type bacillus but also with respect to other organisms, the action of which had been tested by other workers either on tumors or in producing the Shwartzman reaction. Table 4 sets forth the results obtained with this type of preparation.

TABLE 4.—*Effect of alcohol-insoluble precipitate on mice bearing sarcoma 180*

Source of product	Number of mice	Complete recessions	Tumors affected but not destroyed	Tumors not affected	Number of mice dying
B proteus	323	100	85	5	33
B typhosus (Rawling strain)	137	81	16	0	40
B coli	73	44	12	0	17
B. pyocyaneus	11	6	1	1	3
B prodigiosus	15	5	9	0	1

It will be noted from the table that the results were considerably better from the standpoint of tumors which receded completely, those affected by the injection, and the mortality of the animals from the treatment. Thus, in a total of 559 mice there were 236 complete recessions, or 42 percent. The number of tumors affected but not brought to complete recession was 123, or 22 percent, while about one-third succumbed to the treatment. Autopsies of the mice which succumbed revealed that the tumors had been affected. In this table the alcohol-insoluble fraction from *B. coli* produced the best results, showing about 60 percent complete recessions in 73 tumor-bearing mice. There were no tumors which were not affected, but the mortality was high (23 percent).

GROSS AND MICROSCOPIC EFFECTS UPON TUMORS

The gross and microscopic effects of the injection upon the tumors are similar to those already described by Gratia and Linz, by Shwartzman, and by Apitz. The *B. proteus* type organism causes the same picture of discoloration of the tumor soon after injection, softening, shrivelling, and eventually the formation of a scab. If vital cells persist at the base of the tumor, a recurrence will take place. The cells become swollen, distorted, and progressively reveal the characteristics of necrosis.

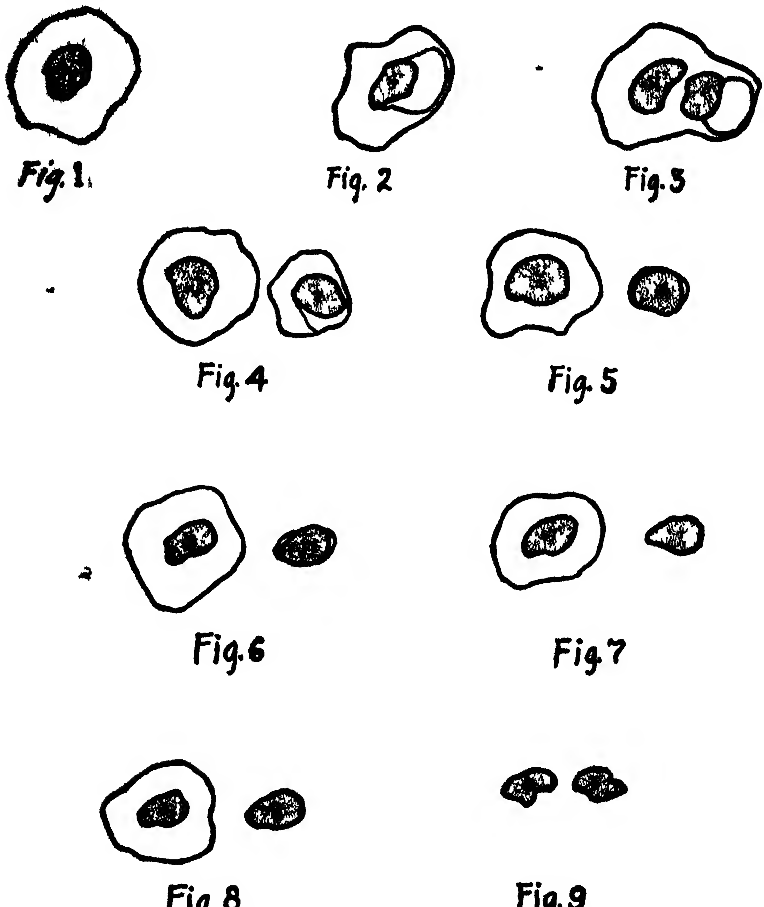
EFFECTS IN VITRO OF BACTERIAL PRODUCTS

The effects, both of heated cultures and of the alcohol-insoluble precipitate from the *proteus* type of organism upon malignant tissues (mouse sarcoma 180), were tested by means of tissue cultures *in vitro*. These tests were carried out either in Carrel flasks or in depression slides. The general technique followed was a halving of both normal and malignant explants, one to be used for treatment and the other for control. For the depression slide the amount of heat-killed culture or the alcohol-insoluble precipitate added to the preparation tested was equal in amount to the quantity of growth-promoting substance (one drop of embryonic extract to 1 cc of Tyrode's solution) employed, e. g., one drop of each. The results obtained were definite. The addition of the bacterial product to the cultures had little effect upon the growth of normal tissue, but the growth of the malignant tissue was inhibited. Inhibition of growth of malignant cells was obtained only with the heat-killed cultures or with the alcohol-insoluble precipitate, filtrates of suspended live organisms having failed to affect the growth of tumor cells. The accompanying figures depict in diagrammatic fashion the effects observed. Figure 1 is chick heart growing in mouse plasma with chick embryonic juice. The darkened area is the original explant; the light area in the surrounding line depicts the growth which has taken place. Figure 2 is mouse sarcoma 180 in the same medium. The outer line indicates, as in figure 1, the amount of growth; but this area includes an inner bordered area that represents the area of liquefaction in which no vital cells are found. Figure 3 shows both mouse heart and tumor growing in the same culture medium. Figure 4 also shows both mouse heart and tumor in the same culture medium. A loopful of filtrate from the *proteus*-type organism had been added. Growth of neither tissue has been inhibited. Figure 5 is chick heart and mouse tumor in the same medium. A loopful of heat-killed culture has been added. The heart tissue has grown, but the tumor tissue has been inhibited. Figures 6, 7, and 8 show chick heart and mouse tumor in the same medium treated with a loopful of Arnold-treated, autoclaved agar washings and the extracted products of *B. proteus*, respectively. The heart shows normal growth, while the tumor shows none. Figure 9 shows mouse heart and tumor in the same medium with no growth from either explant when the cultures are infected with the living *B. proteus* organism.

DISCUSSION

It is evident that the type of reaction produced upon the transplantable mouse tumors by both the killed organism and the alcohol-insoluble precipitate derived therefrom is similar to that

already reported by Gratia and Linz with the *B. coli* filtrate on the transplantable liposarcoma of guinea pigs, by Shwartzman and Michailovsky upon CR 180 with the meningococcus filtrate, and by Duran-Reynals upon a variety of laboratory tumors also with a *B. coli* filtrate. The typical hemorrhagic action within the tumor accompanied by edema and destruction of the cell, as described by



Diagrams showing the effects in vitro of bacterial products upon malignant tissues.

Apitz and others, is also brought about by the use of a *proteus*-type organism. Apitz was able to produce the same reactions with agar solutions, antigen-antibody mixtures, and with antihomologous serum. The property of reacting to the injection of a bacterial product in the manner described is obviously not a general characteristic of tumors. Duran-Reynals concluded from his work upon a variety of mouse and rat tumors, both spontaneous and transplant-

able, that the rapidly growing transplantable tumors were the most susceptible. The present work would confirm that observation with the use of the *proteus*-type organism.

SUMMARY

The heat-killed cultures or the alcohol-insoluble fraction from a gram-negative bacillus belonging to the *proteus* group, upon injection into mice bearing transplantable sarcomas, causes a hemorrhagic reaction followed by destruction of tumor cells frequently resulting in complete recession of the tumors. A similar effect is observed by injection of the alcohol-insoluble fraction of *B. typhosus* and *B. coli*. The reaction is similar to that reported by other workers (Gratia and Linz, Shwartzman, Apitz, and others) with the use of bacterial filtrates. The alcohol-insoluble fraction from *B. proteus* also inhibits the growth of sarcoma 180 in tissue cultures, but has little effect upon the normal cells used as controls.

ACKNOWLEDGMENT

Acknowledgment is here made, with thanks, for the technical assistance and cooperation of Senior Medical Technician Theresa Shovelton.

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DEATHS DURING WEEK ENDED DEC. 28, 1935

[From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 28, 1935	Corresponding week, 1934
Data from 86 large cities of the United States:		
Total deaths	8,960	9,180
Deaths per 1,000 population, annual basis	12.5	12.8
Deaths under 1 year of age	509	580
Deaths under 1 year of age per 1,000 estimated live births	47	54
Deaths per 1,000 population, annual basis, 52 weeks of year	11.4	11.4
Data from industrial insurance companies:		
Policies in force	67,841,506	67,078,445
Number of death claims	10,593	11,184
Death claims per 1,000 policies in force, annual rate	8.1	8.7
Death claims per 1,000 policies, 52 weeks of year, annual rate	9.5	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Jan. 4, 1936, and Jan. 5, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 4, 1936, and Jan. 5, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935
New England States:								
Maine	5	4	1	18	181	42	0	0
New Hampshire		2		1	2	24	0	0
Vermont		4			203		0	0
Massachusetts	13	11			241	195	1	1
Rhode Island		2		1	135	11	1	0
Connecticut	1	4	31	236	93	433	2	1
Middle Atlantic States:								
New York	42	36	[1] 21	[1] 47	543	671	12	5
New Jersey	14	23	9	338	12	39	3	1
Pennsylvania	68	76			283	1,334	3	4
East North Central States:								
Ohio	51	64	8	11	79	377	2	7
Indiana	40	39	40	183	4	353	3	0
Illinois	67	57	20	158	36	1,661	9	12
Michigan	20	4	3		22	45	3	0
Wisconsin	2	7	44	42	63	448	2	1
West North Central States:								
Minnesota	5	5		1	66	375	0	2
Iowa	11	8	1	30	5	810	6	0
Missouri	27	62	150	192	13	161	5	0
North Dakota	2	6	2	319	2	152	0	1
South Dakota				1	4	19	0	0
Nebraska	5	9			43	94	0	0
Kansas	13	8	7	13	7	378	0	3
South Atlantic States:								
Delaware	1	5		6	85	7	1	0
Maryland [3]	7	9	37	420	72	26	3	0
District of Columbia	18	3	4	25	5	10	2	0
Virginia	25	34			16	252	4	4
West Virginia	14	27	139	143	1	362	3	2
North Carolina	22	27	16	409	3	604	4	4
South Carolina	1	5	239	2,000	1	12	1	0
Georgia [3]	10	11	135	481			3	0
Florida	13	3	5	30	1	19	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 4, 1936, and Jan. 5, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan 5, 1935	Week ended Jan. 4, 1936	Week ended Jan 5, 1935
East South Central States:								
Kentucky	19	36	13	209	46	438	7	1
Tennessee	17	12	81	251	6	11	9	2
Alabama [3]	18	23	213	510	19	155	3	2
Mississippi [3] [4]	12	15					2	0
West South Central States:								
Arkansas	19	12	87	37	5	2	2	1
Louisiana	10	34	20	9	21	29	1	1
Oklahoma [4]	16	12	77	119	4	4	7	2
Texas	21	76	155	423	2	88	3	1
Mountain States:								
Montana	1	5	41	14	17	88	1	6
Idaho	4			1	11	3	0	0
Wyoming	2				2	7	2	0
Colorado	9	5		0	5	396	3	1
New Mexico	1	4	2	11		19	1	1
Arizona	10		91	116	3	14	0	1
Utah [3]		1		2	1	10	0	0
Pacific States:								
Washington	1	2			79	44	1	0
Oregon	3	6	32	71	345	15	2	0
California	40	45	62	87	422	85	8	1
Total	700	843	1,786	6,965	3,209	10,322	130	68

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan 5, 1935	Week ended Jan 4, 1936	Week ended Jan 5, 1935	Week ended Jan 4, 1936	Week ended Jan 5, 1935
New England States:								
Maine	1	0	19	23	0	0	0	0
New Hampshire	0	0	13	3	0	0	0	0
Vermont	0	0	11	27	0	0	0	0
Massachusetts	1	3	234	146	0	0	2	3
Rhode Island	0	0	25	10	0	0	0	0
Connecticut	0	1	40	51	0	0	2	1
Middle Atlantic States:								
New York	4	1	620	444	0	0	4	13
New Jersey	2	2	121	100	0	0	0	2
Pennsylvania	0	2	528	643	0	0	9	35
East North Central States.								
Ohio	0	0	378	656	1	0	2	7
Indiana	1	0	273	175	7	4	0	2
Illinois	0	0	521	655	5	2	4	10
Michigan	1	0	194	98	0	0	1	3
Wisconsin	0	0	417	338	16	9	0	2
West North Central States:								
Minnesota	0	0	320	97	2	5	2	1
Iowa	3	1	113	53	1	4	0	2
Missouri	0	0	148	91	7	0	0	12
North Dakota	0	1	33	20	2	5	1	0
South Dakota	0	0	52	45	5	3	1	0
Nebraska	0	1	151	49	23	6	0	3
Kansas	1	0	143	111	11	2	0	1
South Atlantic States:								
Delaware	0	0	12	37	0	0	1	0
Maryland [3]	0	0	64	105	0	0	2	1
District of Columbia	0	0	18	26	0	0	1	6
Virginia	0	0	45	72	0	2	12	9
West Virginia	0	0	64	130	0	12	0	10
North Carolina	0	0	29	59	1	0	2	5
South Carolina	0	0	12	9	0	4	2	0
Georgia [3]	0	0	15	7	0	0	4	3
Florida	0	0	12	8	0	0	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 4, 1936, and Jan. 5, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935	Week ended Jan. 4, 1936	Week ended Jan. 5, 1935
East South Central States:								
Kentucky	1	0	57	99	0	1	5	13
Tennessee	0	0	42	34	0	0	3	2
Alabama [3]	0	1	11	19	0	8	1	2
Mississippi [2] [3]	0	0	17	13	0	0	0	3
West South Central States:								
Arkansas	0	0	33	1	0	7	9	2
Louisiana	0	2	15	41	0	2	7	11
Oklahoma [4]	1	0	33	125	0	0	1	6
Texas	0	0	51	65	3	2	0	25
Mountain States:								
Montana	0	1	193	35	34	1	0	0
Idaho	0	0	33	1	0	0	0	1
Wyoming	0	0	229	13	4	10	0	0
Colorado	0	0	141	185	31	1	1	0
New Mexico	0	0	53	10	0	0	9	2
Arizona	0	0	15	17	0	0	0	1
Utah [2]	0	0	80	61	0	1	0	0
Pacific States:								
Washington	0	0	78	49	6	64	2	0
Oregon	0	0	51	51	0	2	1	1
California	5	13	284	193	4	18	8	8
Total	21	29	6,041	5,300	163	175	99	208

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Jan. 4, 1936, 8 cases, as follows: Georgia, 1; Alabama, 2; Mississippi, 5.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1935										
Colorado	2	54			17		3	440	13	21
November 1935										
Arizona	4	27	173		8	3	5	136	0	6
Colorado	6	50			24		3	500	47	5
Hawaii Territory		1	2,578		3		0	1	0	4
Mississippi	3	54	3,580	3,221	32	187	3	130	2	34
Nevada			18		184		0	12	0	0
Rhode Island		2			69		13	52	0	0
December 1935										
Arkansas	9	57	221	76	8	30	3	68	1	22
Delaware		3			291		0	50	0	3
Indiana	17	206	142		53		1	912	13	13

Summary of monthly reports from States—Continued

October 1935

	Cases
Colorado:	
Chicken pox	118
Impetigo contagiosa	11
Mumps	71
Septic sore throat	6
Vincent's infection	1
Whooping cough	34

November 1935

	Cases
Chicken pox:	
Arizona	81
Colorado	395
Hawaii	34
Mississippi	287
Nevada	6
Rhode Island	34
Dysentery:	
Arizona	11
Mississippi (amoebic)	93
German measles:	
Arizona	23
Rhode Island	2
Hookworm disease:	
Mississippi	242
Impetigo contagiosa:	
Colorado	31
Leprosy:	
Hawaii Territory	2

November 1935—Continued

	Cases
Mumps:	
Arizona	199
Colorado	203
Hawaii Territory	20
Mississippi	316
Nevada	12
Rhode Island	86
Puerperal septicemia:	
Mississippi	19
Rabies in animals:	
Mississippi	16
Septic sore throat:	
Arizona	5
Trachoma:	
Arizona	54
Colorado	1
Mississippi	3
Typhus fever:	
Hawaii Territory	1
Undulant fever:	
Arizona	2
Colorado	1
Whooping cough:	
Arizona	6
Colorado	60
Hawaii Territory	31
Mississippi	303
Rhode Island	31

December 1935

	Cases
Chicken pox:	
Arkansas	139
Delaware	85
Indiana	492
Epidemic encephalitis:	
Indiana	1
German measles:	
Delaware	1
Mumps:	
Arkansas	279
Delaware	13
Indiana	163
Rabies in animals:	
Indiana	37
Septic sore throat:	
Indiana	6
Trachoma:	
Arkansas	2
Tularaemia:	
Arkansas	1
Indiana	2
Undulant fever:	
Arkansas	2
Whooping cough:	
Arkansas	22
Delaware	30
Indiana	185

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 28, 1935

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	1	0	0	3	2	0	0	0	9	25
New Hampshire:											
Concord	0		0	0	1	3	0	0	0	4	19
Manchester	0		0	1	1	2	0	0	0	0	9
Nashua	0			0		0	0		0	0	
Vermont:											
Barre	0		0	0	0	0	0	0	0	0	4
Burlington	0		0	0	0	0	0	0	0	0	7
Rutland	0		0	2	0	1	0	0	0	0	7
Massachusetts:											
Boston	1		0	35	30	67	0	6	3	3	236
Fall River	4		0	0	3	1	0	0	0	0	31
Springfield	0		0	0	3	2	0	1	0	6	33
Worcester	0		0	0	6	15	0	1	0	6	52
Rhode Island:											
Pawtucket	0		0	0	0	2	0	0	0	0	18
Providence	0		0	6	10	6	0	2	0	6	67
Connecticut:											
Bridgeport	0	6	0	1	5	3	0	1	0	2	38
Hartford	0		0	1	4	3	0	1	0	10	57
New Haven	0		0	0	4	1	0	1	0	4	33
New York:											
Buffalo	2		2	7	9	47	0	3	0	15	139
New York	32	19	11	100	148	190	0	89	9	60	1,582
Rochester	1		0	1	6	1	0	0	0	6	75
Syracuse	0	1	1	1	2	3	0	1	0	22	60
New Jersey:											
Camden	2	1	1	0	6	2	0	2	0	6	33
Newark	1		0	1	9	15	0	3	1	15	94
Trenton	0		0	0	2	2	0	0	0	1	35
Pennsylvania:											
Philadelphia	8	1	1	80	33	67	0	22	2	57	489
Pittsburgh	4	5	4	15	26	42	0	4	0	5	168
Reading	0		0	0	3	4	0	2	0	0	47
Scranton	0			0		4	0		0	0	

City reports for week ended Dec. 28, 1935—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Ohio:											
Cincinnati	6	------	1	2	16	10	0	7	0	0	147
Cleveland	2	33	4	11	20	17	0	11	0	15	194
Columbus	2	------	0	0	12	12	0	1	0	1	91
Toledo	0	1	1	12	3	8	0	1	0	11	62
Indiana:											
Anderson	0	------	0	0	1	0	1	0	0	2	9
Fort Wayne	6	------	0	0	2	3	0	0	0	0	28
Indianapolis	2	------	0	0	16	6	0	6	0	2	118
Muncie	0	------	1	1	1	2	0	1	0	0	14
South Bend	1	------	0	0	1	3	0	1	1	6	17
Terre Haute	0	------	0	0	0	0	0	0	0	0	18
Illinois:											
Alton	0	------	0	0	0	4	0	1	0	0	9
Chicago	12	7	5	5	72	185	1	24	1	118	728
Elgin	0	------	0	0	5	0	0	0	0	0	14
Moline	0	------	1	0	0	5	0	0	0	0	9
Springfield	1	------	0	0	4	11	0	0	0	1	34
Michigan:											
Detroit	8	3	3	1	30	54	0	13	1	56	270
Flint	2	------	0	0	6	8	0	1	0	0	40
Grand Rapids	0	------	0	3	3	18	0	0	0	2	37
Wisconsin:											
Kenosha	0	------	0	0	1	3	0	0	0	3	9
Milwaukee	0	------	0	4	8	44	0	0	0	85	88
Racine	0	------	0	3	1	21	0	1	0	5	12
Superior	0	------	0	0	0	0	0	0	0	0	13
Minnesota:											
Duluth	0	------	0	0	0	2	0	1	0	2	17
Minneapolis	0	------	0	14	6	86	0	2	0	2	102
St. Paul	0	------	0	6	10	24	0	1	0	[illegible]	63
Iowa:											
Cedar Rapids	0	------	------	0	------	1	0	------	0	0	------
Davenport	0	------	------	0	------	6	0	------	0	0	------
Des Moines	1	------	------	1	------	5	1	------	0	1	37
Sioux City	0	------	------	1	------	7	1	------	0	0	------
Waterloo	6	------	------	0	------	0	0	------	0	1	------
Missouri:											
Kansas City	1	------	2	0	13	10	0	1	1	0	103
St. Joseph	2	------	2	1	4	2	0	0	0	0	33
St. Louis	14	------	1	2	20	29	0	4	0	4	248
North Dakota:											
Fargo	------	------	------	------	------	------	------	------	------	------	------
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	------	0	------	5	0	------	0	0	------
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Nebraska:											
Omaha	0	------	0	3	7	94	2	4	0	0	68
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	2
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	1	1	0	3	10	0	0	0	0	33
Delaware:											
Wilmington	1	------	0	0	3	1	0	1	0	3	22
Maryland:											
Baltimore	4	2	2	2	20	32	0	7	5	12	217
Cumberland	1	------	0	0	1	1	0	0	0	0	19
Frederick	0	------	0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	17	------	0	0	18	14	0	14	0	1	164
Virginia:											
Lynchburg	0	------	0	2	0	2	0	0	0	4	11
Norfolk	1	------	0	0	3	4	0	4	0	0	26
Richmond	0	------	1	0	6	1	0	2	0	0	60
Roanoke	------	------	------	------	------	------	------	------	------	------	------
West Virginia:											
Charleston	0	1	1	1	2	8	0	0	0	0	21
Huntington	1	------	------	0	------	6	0	------	0	0	------
Wheeling	1	------	0	0	3	2	0	0	0	0	23
North Carolina:											
Gastonia	0	------	0	0	1	0	0	0	0	0	3
Raleigh	0	------	0	0	2	0	0	1	0	0	11
Wilmington	0	------	0	0	2	0	0	0	0	7	12
Winston-Salem	0	------	0	0	1	1	0	0	0	0	10

City reports for week ended Dec. 28, 1935—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
South Carolina:											
Charleston	1	13	2	0	5	6	0	0	0	2	21
Columbia											
Florence	0		0	0	1	0	0	0	0	0	7
Greenville	0		0	2	1	0	0	0	0	0	7
Georgia:											
Atlanta	7	34	4	0	13	8	0	2	0	0	97
Brunswick	0		0	0	0	1	0	0	0	0	6
Savannah	3	47	5	0	9	4	0	4	0	2	56
Florida:											
Miami	1		0	1	1	1	0	2	0	0	37
St. Petersburg											
Tampa											
Kentucky:											
Ashland	0			0		0	0		0	0	
Covington	1		0	0	3	5	0	0	0	0	15
Lexington	1		0	0	2	0	0	1	0	0	23
Louisville	2		2	0	13	5	0	9	0	3	111
Tennessee:											
Knoxville	2	13	1	0	7	0	0	0	0	0	33
Memphis	1		0	0	17	13	0	6	0	0	77
Nashville	0		3	0	16	0	0	1	0	0	68
Alabama:											
Birmingham	1	5	4	1	13	3	0	5	0	0	77
Mobile	0		0	0	6	0	0	0	0	0	24
Montgomery	0	7		0		0	0		0	0	
Arkansas:											
Fort Smith	1			0		0	0		0	0	
Little Rock	0		1	0	3	3	0	1	0	0	
Louisiana:											
Lake Charles	2		0	0	0	0	0	0	1	0	5
New Orleans	8	8	1	6	23	5	0	11	0	6	202
Shreveport	1		0	0	7	0	0	2	0	0	39
Oklahoma:											
Oklahoma City		10	0	0	3	4	0	0	0	0	42
Texas:											
Dallas	7		0	0	14	6	0	3	1	0	66
Fort Worth	2		1		4	6	0	1	0	0	43
Galveston	2		0	0	2	0	0	1	0	0	21
Houston	4		2	0	12	5	0	6	1	0	94
San Antonio	1		2	0	7	0	0	3	0	0	52
Montana:											
Billings	0		0	0	3	14	0	0	0	1	14
Great Falls	0		0	0	2	3	1	0	0	2	10
Helena	0		0	0	0	3	0	0	0	0	4
Missoula	0		0	0	1	8	0	0	0	0	3
Idaho:											
Boise	0		0	4	1	1	0	0	0	0	5
Colorado:											
Colorado Springs	0		1	0	5	10	0	1	0	0	24
Denver	4		1	7	9	24	0	3	0	1	106
Pueblo	0		0	0	2	19	0	0	0	0	13
New Mexico:											
Albuquerque	0		3	1	1	21	0	3	0	2	17
Utah:											
Salt Lake City	1		1	2	4	50	0	0	0	3	46
Nevada:											
Reno											
Washington:											
Seattle	0		2	10	4	25	6	3	0	2	97
Spokane	0		0	6	4	2	0	0	0	0	31
Tacoma	0		0	2	2	2	0	0	0	2	27
Oregon:											
Portland	0		1	54	7	13	0	3	0	2	86
Salem	0	1		0		1	0		0	0	
California:											
Los Angeles	11	26	3	24	25	30	0	21	1	20	329
Sacramento	0		0	2	1	21	0	1	2	3	24
San Francisco	0		2	70	11	28	0	10	0	14	199

City reports for week ended Dec. 28, 1935—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	1
Massachusetts:			
Boston	0	1	1
Worcester	1	2	0
Rhode Island:			
Providence	1	0	1
New York:			
New York	5	7	1
New Jersey:			
Newark	0	0	1
Pennsylvania:			
Philadelphia	7	0	0
Ohio:			
Cincinnati	1	0	0
Cleveland	1	0	0
Indiana:			
Indianapolis	1	1	0
Muncie	1	0	0
South Bend	1	1	0
Illinois:			
Chicago	9	4	0
Moline	1	0	0
Michigan:			
Detroit	3	2	0
Flint	1	1	0
Minnesota:			
Minneapolis	1	0	0
Iowa:			
Davenport	0	0	1
Missouri:			
Kansas City	1	1	0
St. Joseph	0	1	0
Kansas:			
Wichita	1	1	0
Maryland:			
Baltimore	3	1	0
District of Columbia:			
Washington	4	3	0
Virginia:			
Lynchburg	1	1	0
North Carolina:			
Wilmington	0	1	0
Georgia:			
Atlanta	2	0	0
Kentucky:			
Louisville	6	1	0
Tennessee:			
Memphis	1	2	0
Arkansas:			
Little Rock	1	0	0
Louisiana:			
New Orleans	1	1	0
Colorado:			
Colorado Springs	0	1	0
California:			
Los Angeles	1	2	0

Epidemic encephalitis.—Cases: Cleveland, 1; Norfolk, 1; San Francisco, 1.

Pellagra.—Cases: Boston, 1, Philadelphia, 1; Atlanta, 1; Savannah, 1; Birmingham, 1; New Orleans, 1; San Francisco, 1.

Typhus fever: Cases: Atlanta, 1, Mobile, 1. Deaths: Mobile, 1.

FOREIGN AND INSULAR

CANADA

Vital statistics—Second quarter 1935.—The Bureau of Statistics of the Dominion of Canada has published the following preliminary statistics for the second quarter of 1935. The rates are computed on an annual basis. There were 20.9 live births per 1,000 population during the second quarter of 1935 and 21.2 per 1,000 population in the same quarter of 1934. The death rate was 9.9 per 1,000 population for the second quarter of 1935 and 9.6 per 1,000 population for the second quarter of 1934. The infant mortality rate for the second quarter of 1935 was 72 per 1,000 live births and 70 in the corresponding quarter of 1934. The maternal death rate was 5.1 per 1,000 live births for the second quarter of 1935, and 5.5 for the same quarter of 1934.

The accompanying tables give the number of births, deaths, and marriages by Provinces for the second quarter of 1935, and deaths from certain causes in Canada for the second quarter of 1935, and the corresponding quarter of 1934, and by Provinces for the second quarter of 1935.

Number of births, deaths, and marriages, second quarter 1935

Province	Live births	Deaths (exclusive of still-births)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	57,103	27,060	4,122	293	19,004
Prince Edward Island	489	253	36	2	82
Nova Scotia	3,057	1,624	228	12	843
New Brunswick	2,722	1,161	191	17	661
Quebec	20,059	8,596	1,906	110	5,396
Ontario	16,478	9,412	936	84	7,355
Manitoba	3,405	1,441	212	19	1,245
Saskatchewan	4,816	1,619	307	19	1,131
Alberta	3,567	1,290	213	19	1,045
British Columbia	2,510	1,664	93	11	1,226

[1] Exclusive of Yukon and the Northwest Territories.

Number of births, deaths, and marriages second quarter 1935—Continued

Cause of death	Canada [1] (second quarter)		Provinces, second quarter, 1935								
	1934	1935	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents	242	238		12	8	59	107	9	11	10	22
Cancer	2,576	2,843	20	158	127	718	1,078	199	171	148	226
Diarrhea and enteritis	564	505	4	14	14	319	77	26	24	18	9
Diphtheria	41	50		2	3	25	7	3	5	1	4
Diseases of the arteries	1,861	2,105	14	124	80	379	1,062	120	82	99	125
Diseases of the heart	4,166	4,080	44	212	130	938	1,812	207	241	193	303
Homicides	30	47		2	1	7	19	5	4	5	4
Influenza	526	944	14	64	43	440	228	24	49	45	37
Measles	54	172		6	4	93	42	11	10	3	3
Nephritis	1,506	1,628	16	88	50	718	502	48	71	42	93
Pneumonia	1,822	2,072	21	132	112	657	711	117	146	81	95
Poliomyelitis	13	17			1	7	2	4	2	1	
Puerperal causes	313	298	2	12	17	110	84	19	19	19	11
Scarlet fever	56	60		4	3	38	10	1	1	2	1
Suicides	230	220	1	10	3	40	86	15	28	13	24
Tuberculosis	1,947	1,815	20	121	92	824	378	126	66	50	138
Typhoid fever and paratyphoid fever	58	53			2	37	4	4	4	1	1
Other violent deaths	1,067	1,067	4	71	45	265	379	57	69	70	107

[1] Exclusive of Yukon and the Northwest Tarrftories.

CUBA

Provinces—Notifiable diseases—4 weeks ended December 14, 1935.—During the 4 weeks ended December 14, 1935, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer				7	2	3	12
Chicken pox						1	1
Diphtheria		1	1	3	4		9
Hookworm disease				1			1
Leprosy		1			3	14	18
Malaria	89	209	157	245	669	556	1,985
Measles					1	1	2
Poliomyelitis	2			7		3	12
Scarlet fever				1			1
Tuberculosis	5	9	10	19	13	38	94
Typhoid fever	1	80	3	20	38	22	164

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for December 27, 1935, pages 1834–1848. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued January 31, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Argentina—Cordoba Province—Rafael Garcia.—During the month of December 1935, 5 cases of plague with 3 deaths were reported in Rafael Garcia, Cordoba Province, Argentina.

China—Manchuria.—A report dated November 27, 1935, states that 23 deaths from plague have occurred in the vicinity of Koshan, Manchuria. An unofficial report also states that 15 cases of plague had occurred in Harbin, Manchuria.

Union of Soviet Socialist Republics.—For the purpose of sanitary protection, the Government of the Union of Soviet Socialist Republics has decreed that the border between it and Manchuria along the Amur River shall be closed on the Sector Kumar-Pashkovo on account of cases of a disease suspected of being plague.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: During the week ended December 28, 1935, 1 case with 1 death at Esplanada, Bahia State, and during the week ended December 21, 1935, 2 cases with 2 deaths at Passos, Minas Geraes State, and 2 cases with 2 deaths at Mattao, Sao Paulo State, Brazil.

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen R C. WILLIAMS, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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DIETS OF LOW-INCOME FAMILIES SURVEYED IN 1933 [1]

Health and Depression Studies No. 3

By DOROTHY G. WIEHL, *Technical Staff, Research and Statistics, Milbank Memorial Fund*

A survey of the food supply of families at various lower income levels was made in the spring of 1933 in nine localities—Baltimore, Birmingham, Cleveland, Detroit, New York, Pittsburgh, Syracuse, a cotton-mill area in South Carolina, and a coal-mining district in West Virginia. The investigation was a part of the study of the health of low-income families which was conducted by the United States Public Health Service in cooperation with the Milbank Memorial Fund. Records of the family food supply for a period of 1 week were obtained for about 100 families in each locality except New York, where 276 records were taken. The foods used during 1 week do not afford sufficient data to evaluate precisely the dietary of *individual* families with respect to the adequacy of specific nutrients, though they do give a general indication of the use of certain foods or food groups, such as milk, meats, bread, vegetables, fruits, etc. However, the averages of the food supply for *groups* of families of comparable economic status are reasonably reliable, even for this short period, and from them one may draw certain conclusions as to the type of dietary which prevailed in these low-income families and the nutritional deficiencies which are most likely to arise from such a diet.

The families for which food records were obtained were drawn from the larger sample of approximately 1,000 families which were canvassed in each community for the general study of illness. The

[1] From the Office of Statistical Investigations, U. S. Public Health Service, and the Division of Research, Milbank Memorial Fund.

This is the third of a series of papers on sickness and medical care in relation to income, unemployment, and other related economic factors among groups of white wage-earning families. The 2 preceding papers are:

(1) Relation of sickness to income and income change in 10 surveyed communities. By G. St. J. Perrott and Selwyn D. Collins. Pub. Health Rep., vol. 50, no. 18, pp. 595-622.

(2) Heights and weights of the children of the depression poor. By Carroll E. Palmer. Pub. Health Rep. vol. 50, no. 33, pp. 1106-1113.

Earlier preliminary papers giving results for parts of the surveyed group are listed in the first paper in this series.

families in the total sample included all white families living in certain blocks or streets in the poorer neighborhoods but not in the "slum" districts. After classifying the families in the general study very roughly according to their 1932 income, a few families were drawn from those at different income levels to obtain approximately equal numbers throughout the range of income reported by the total group. The families so drawn were revisited and the informant was questioned about the food bought and amounts used during the preceding week. For the same week, data were obtained concerning the amount of wages or other funds available for expenditures. In all localities except New York City, the data were collected within the period April 24 to May 19; in New York the visiting was continued until the end of June.

After classifying the families according to their weekly income per person, the average quantities of various foods or groups of foods were computed for families in each income class in each of the localities. Since in five of the cities, Baltimore, Cleveland, Detroit, Pittsburgh, and Syracuse, these tabulations showed no basic differences in food habits of the families, the data have been combined into one group of 472 families which, it is believed, are fairly typical of low-income families of the large industrial cities in the North. The seasonal difference in the records for New York and the fact that income requirements for an adequate food supply seemed to be slightly higher made it appear desirable to present the New York data separately. The other three localities were characterized by a diet basically different from that in the Northern cities, as it contained large amounts of fat meat, biscuit or corn bread, and sirup, which are all typical of the diet of the low-income southern family; but among these three communities there were also recognizable differences, and their data therefore, are considered separately.

ENERGY VALUE OF FOOD SUPPLY

The quantity of food needed to provide the energy used by individuals of specific age, sex, and body weight, and engaged in a certain type of activity, has been carefully measured and is expressed in terms of the calories available in the food to supply this energy; but in the present study, average needs must be used for measuring the requirements of groups of individuals. Various standards for average calories needed by persons of a specific sex and age have been prepared; the particular one used in this study was furnished by the

Bureau of Home Economics of the United States Department of Agriculture.[3] A daily supply of 3,000 calories is taken as adequate for the moderately active adult male. Using this amount as a base, the energy needs of persons of each sex and age are expressed as a percentage. For each 100 percent or equivalent of an adult male in the population (adult male unit), there should be food yielding 3,000 calories per day. The scale of proportional requirements by sex and age used was found to give average requirements for population groups very close to those based on other scales, in spite of slight differences in the allowances for some age groups.

Various nutritionists have outlined diets which supply what are considered more nearly marginal requirements for family groups. Many of these would yield from 2,600 to 2,700 calories per day per adult male unit on the basis of the scale of proportional requirements by sex and age used in this study. Although it is impossible to set an absolute minimum calorie requirement below which the food supply cannot fall without endangering health, an average daily energy supply of about 2,700 calories per adult male unit seems to be a reasonable minimum for ordinary population groups, and an adequate supply of 3,000 calories is desirable to assure full provision for growing children and protection of the health of adults.

The five northern cities.—When the income for the week was $3 or more per person, the average family in these five cities had a food supply which furnished something over 3,000 calories per day per equivalent adult male (table 1). Below this income level the calories available from the average food supply were less than 3,000. For families whose income was $2 to $3 the calories averaged 2,800, and for those with less than $2 the calories averaged 2,470 per day. Fam-

[3] The scale for relative allowances of calories for individuals by sex, age, and activity furnished by the Bureau of Home Economics is as follows:

Age (years) and activity	Relative allowance (percent)		Age	Relative allowance (percent)	
	Men	Women		Men	Women
14	100	90	Under 2 years	30	30
15	100	80	2 to 3 years	40	40
16 to 17	110–130	80	4 to 5 years	50	50
18 to 59, moderate activity	100	90	6 to 7 years	60	60
18 to 59, light activity	90	80	8 years	70	70
18 to 59, sedentary	80	70	9 to 10 years	80	70
60 or older, moderate activity	90	80	11 to 12 years	90	80
60 or older, sedentary	80	70	13 years	90	90

In computations for the present study, all men and women aged 18 to 59 were counted as moderately active. See explanatory note at end of article.

ilies on relief [3] had a food supply yielding 2,700 calories per day, approximately equal to minimum requirements and higher than that of the lowest income nonrelief group.

TABLE 1.—*Average calories per day per adult male unit and distribution of families according to caloric value of the food supply for families of various incomes. (Based on records of a week's food supply for 472 families in Baltimore, Cleveland, Detroit, Pittsburgh, and Syracuse, April–May 1933)*

Weekly income per capita	Number of families	Calories per day per adult male unit [1]	Percent of families having specified calories			
			Less than 2,200	2,200 to 2,699	2,700 to 3,399	3,400 or more
Relief	177	2,700	24.9	32.2	25.4	17.5
Less than $2	77	2,470	27.5	33.8	31.2	7.8
$2 to $2.99	60	2,800	16.7	35.0	28.3	20.0
$3 to $3.99	46	3,180	13.0	8.7	41.3	37.0
$4 or more	112	3,350	4.5	17.0	33.0	45.5

[1] Average of the calories per day per adult male unit for each family, i. e., each family has the same weight in the average regardless of its size

Within each income class, the calories in the food supply of the individual family [4] varied over a wide range, and the distribution of families according to the caloric value of their food supply also is shown in table 1. About one-fifth of the families with $3 or more per week reported food yielding less than 2,700 calories per day, but three-fifths of the families with less than $2 and nearly as large a proportion of the families on relief had less than 2,700 calories. In the lowest income and relief groups, about one-fourth of the families had less than 2,200 calories per day per adult male unit, and some of these families reported very acute food shortages. It seems very probable that there were many families which were seriously undernourished.

Large families in each income class were more likely to have an insufficient quantity of food than small families, as shown in table 2. Families with not more than four persons with a weekly income of less than $3 per person had an average food supply that was fairly adequate, but larger families had less than 2,600 calories. The very large families on relief seem to have fared especially badly. Relief families consisting of 8 or more persons reported, on the average, a food supply furnishing only 2,430 calories per adult male per day, but those of 5 to 7 persons had 2,670 calories.

[3] All families on relief are grouped together, although some had cash relief, with and without work, others received grocery orders, a few families received food boxes, and some had combinations of cash and supplementary food. They represent an unselected cross-section of families receiving aid from some organized agency

[4] As the food records are for 1 week and the food supply of families with such limited incomes may vary considerably from week to week, we cannot assume that these families had the same food supply over long periods, even though practically all of them reported it as "usual" Also, there is opportunity both for relatively large error in the reporting and in the estimating of weights of items for which only price or number of units, such as cans, packages, etc, was stated These errors tend to compensate each other when we consider the food supply of groups of families but cannot do so in a 1 week's record for an individual family.

TABLE 2.—*Calories in food supply of families according to size of family and income. (Based on records of a week's food supply for 472 families in Baltimore, Cleveland, Detroit, Pittsburgh, and Syracuse, April–May 1933)*

Size of family	Average calories daily per adult male unit			Number of families		
	Relief families	Under $3 per person per week	$3 or more per person per week	Relief families	Under $3 per person per week	$3 or more per person per week
1 to 4 persons	2,910	2,880	3,400	62	37	89
5, 6, or 7 persons	2,670	2,530	3,180	81	70	57
8 or more persons	2,430	2,570	3,190	34	30	12

New York City.—In table 3 are shown the calories per day per adult male unit for the average family in a specific income class in New York City and the distribution of families according to the supply of calories. Families with an income of $4 to $6 per person per week reported a food supply which, on the average, would furnish 3,000 calories per day per adult male unit, adequate for standard energy requirements, and those with higher incomes had a food supply which averaged 3,340 calories.

TABLE 3.—*Average daily supply of calories per adult male unit and distribution of families according to calorie supply for families of various low incomes in New York City, May–June 1933*

Weekly income per capita	Number of families	Calories per day per adult male unit	Percent of families having specified calories			
			Under 2,200	2,200 to 2,699	2,700 to 3,399	3,400 or more
Home relief	56	2,790	28.6	19.6	33.9	17.9
Work-relief wage	27	2,450	44.4	29.6	14.8	11.1
Less than $3	38	2,390	39.5	31.6	23.7	5.3
$3 to $3.99	35	2,420	45.7	14.3	37.1	2.9
$4 to $5.99	64	3,000	17.2	20.3	37.5	25.0
$6 or more	56	3,340	5.4	19.7	37.5	37.5

For families with $3 to $4 and lower incomes, the average fuel value of the food supply was approximately 20 percent less than 3,000 calories. Families on work relief reported a diet yielding about the same number of calories per adult male unit as other low-income families. This is consistent with their income, inasmuch as these families received $11.25 per week regardless of the number of persons. For these low-income groups the available energy value was considerably less than average minimum needs.

Families on home relief, i. e., receiving food orders, reported a more adequate amount of food than either the work-relief families or the nonrelief families with less than $4. The calories per adult male unit averaged 2,790 which, as stated above, is a little higher than the energy value of diets planned by nutrition experts to provide a

limited or marginal diet that will prevent serious undernutrition if a proper choice of foods is made.

The distribution according to their individual calorie supply indicates that 60 to 75 percent of the families with less than $4 per person per week had less than the restricted or marginal standard for calorie needs, and that 40 to 46 percent had less than 2,200 calories per day per adult male unit. These are much higher proportions than were found in the "five cities", where 17 percent of the $2 to $3 income class and 27 percent of the under $2 class had less than 2,200 calories. Among home relief families, the corresponding percentage was 29. Even among families with $4 to $6 per person per week in New York, there were 17 percent that reported a food supply yielding less than 2,200 calories.

Size of family showed an inverse relationship to the adequacy of the amount of food among relief families and those of higher income but not among lower income families, as shown in table 4. Home relief families of 2 to 4 persons were well supplied and had adequate calories, but larger families had much less food per adult male unit. Among families with less than $4 per person, the smaller families of 2 to 4 persons had slightly less food than the families of 5 to 7 persons. The explanation probably is that the small family with a total income of $6 to $10 a week has to use a large share of it for rent and has little left for food, while the larger family in this per capita class may have a total income two or three times as high out of which it pays little, if any, more for rent.

TABLE 4.—*Calories in food supply of families according to size of family and income, in New York City, May–June 1933*

Size of family	Average calories daily per adult male unit			Number of families		
	Home-relief families	Under $4 per person per week [1]	$4 or more per person per week	Home-relief families	Under $4 per person per week [1]	$4 or more per person per week
2, 3, or 4 persons	3,180	2,390	3,360	22	21	70
5, 6, or 7 persons	2,650	2,550	2,860	25	55	48
8 or more persons	2,210	2,180	----------	9	24	2

[1] Including work-relief families

Birmingham.—More families in the Birmingham survey reported relatively high incomes than in the other cities, except New York, and tabulations are given (table 5) for an upper income class of $6 or more per person per week. There were 24 families receiving relief which consisted of food allowances from the Red Cross. The average calories in the food supply reported by the families in each income class and by relief families approximately equaled or exceeded the standard requirement of 3,000 calories per day per adult male.

Because of the small number of families in each income class, caution must be used in considering these families as typical of low-income families in this city.

TABLE 5.—*Average calories per day per equivalent adult male in a week's food supply of families of different economic status in Birmingham, Ala., May 1933*

Weekly income per capita	Number of families	Number of persons	Number of adult male units	Calories per day per adult male unit
Relief (food)	24	134	104.1	2,960
Less than $2	15	79	62.8	3,240
$2 to $2.99	8	46	35.4	3,410
$3 to $3.99	10	48	36.6	3,320
$4 to $5.99	13	69	53.2	3,560
$6 or more	17	74	52.0	3,740

Mill villages in South Carolina.—Diet records were obtained for 102 families in 4 cotton-mill villages near Greenville, S. C. The mills were running at the time the data on food supply were collected, and all families had some earned income. Three families used flour donated by the Red Cross, but these families have been counted with other families in the same income group. The owning of cows is a common practice in many mill villages, and 27 of the families in our study had a cow. For these families the food records were tabulated separately.

For each income group the calories averaged much more than 3,000 per day per equivalent adult male (table 6). Families with more than $3 per week per person and those owning cows had a food supply yielding over 4,000 calories. The typical diet includes large amounts of fat meat, flour, and cornmeal, foods of high caloric value; but it is likely that there was some overstatement of the amounts *consumed* of these articles which are bought usually in large quantities. In the case of families which owned cows, it is very probable that some of the milk was wasted and also that the estimate of the daily amount given by the cow was a little high.

TABLE 6.—*Average calories per day per equivalent adult male in a week's food supply of families of different economic status in South Carolina cotton-mill villages, May 1933*

Weekly income per capita and cow-ownership	Number of families	Number of persons	Number of adult male units	Calories per day per adult male unit
Families owning cow:				
Less than $2	13	95	67.5	4,120
$2 or more	14	88	60.8	4,460
Families without cows:				
Less than $2	22	147	112.3	3,520
$2 to $2.99	24	148	117.2	3,930
$3 to $3.99	15	80	61.5	4,140
$4 or more	14	62	48.7	4,930

The food supply of families in seven cotton-mill villages in the same section of South Carolina was studied in 1916 by Goldberger, Wheeler, and Sydenstricker.[5] They obtained a record, from the local stores, of food purchased in a 2-week period between April 16 and June 15, supplemented by a report from the family of other items. These data did not include home-grown garden produce. In their report the average calories per day per adult male unit were 4,267 for 60 highest income families, and 3,836 for 184 low-income families; but when these averages are adjusted to the scale of adult units used in the present study, the calories in the 1916 study would be about 3,800 and 3,400, respectively.

Coal-mining towns in West Virginia.—The food records for 101 coal miners' families were taken in several mining towns near Morgantown, W. Va. There were no families living wholly on organized relief, but approximately one-half of all families in the survey and three-fourths of those with less income than $2 per person in the week of record were given flour or milk or both.

TABLE 7.—*Average calories per day per equivalent adult male in a week's food supply of families of different economic status in several mining towns in West Virginia, April 1933*

Relief class and weekly income per capita	Number of families	Number of persons	Number of adult male units	Calories per day per adult male unit
Relief families [1]				
Flour and milk	18	114	78.5	3,440
Flour only	17	94	77.7	2,910
Milk only	10	69	49.2	3,540
No relief				
Less than $2	12	64	46.5	3,150
$2 to $2.99	18	97	75.3	3,830
$3 to $3.99	7	42	31.0	4,070
$4 or more [2]	19	76	60.0	3,930

[1] None of these had an income of $3 or more per week per capita
[2] Includes 4 families which had flour that had been given to them

The average food supply of families in each income group would furnish adequate calories (table 7). For families with more than $2 per person per week the calories averaged 3,830 to 4,070 daily per equivalent adult male, and for families with less than $2 the calories averaged 3,150. For families given free flour or milk, or both, the average supply of calories varied from 2,910 to 3,540.

AVERAGE DIETARIES ACCORDING TO INCOME

In addition to sufficient energy value, the human body must be provided with an adequate supply of each of a number of essential nutrients. Care in the selection of foods is necessary to assure required amounts of each of the food factors essential for a balanced

[5] Goldberger, Joseph, Wheeler, G. A., and Sydenstricker, Edgar A study of the relation of diet to pellagra incidence Pub Health Rep, Mar 19, 1920. (Reprint No 587.)

diet, especially of the mineral elements and vitamins which are important to insure health and proper growth of children. An adequate supply of milk, vegetables, fruits, and eggs should be the first concern of the family, as these are the principal sources of most minerals and vitamins; the remainder of the diet can be determined by individual preference and funds available.

For the purpose of judging the approximate adequacy of various food elements in the dietary of these families, the amounts of specific kinds of food reported are compared with amounts recommended as providing at a minimum cost an adequate supply of the essential nutrients, though not a liberal or optimal supply. A further comparison is made with a more restricted dietary which is designed to furnish "approximately the minimum requirements of the body for the various nutrients, but allows little margin for safety. * * * It represents quantities of 'protective' and other foods below which it is not safe to reduce the food supply."[6] From the requirements for each type of food given by Stiebeling and Ward [7] to supply persons of each sex and different ages with an adequate diet at minimum cost, an average amount per week per adult male unit was computed, which is used as a standard for a minimum cost adequate dietary. Similarly, average amounts in the restricted dietary were computed to obtain a standard with which amounts actually purchased can be compared.

These standards cannot be absolute and, of course, some substitutions and variations are possible without destroying the nutritional balance. For example, a dietary at a higher level of cost probably will include more liberal quantities of fresh and canned vegetables and fruits, and more meat; these will be offset by reduced consumption of other foods, such as dried legumes and fruits, potatoes, and bread. However, the quantities of milk, vegetables, fruits, and eggs in the restricted standard are a minimum and should not be replaced by other foods.

The five cities.—The average amounts of specific foods or groups of foods reported by families in each income class are shown for the five cities and for New York City in figure 1.[8] The amount used can be

[6] See Stiebeling, Hazel K., and Ward, Medora M.: Diets at 4 levels of nutritive content and cost. U. S. Department of Agriculture Circular No. 296, p. 4.

[7] Idem, pp 14–19.

Since the required amounts of each nutrient do not vary by sex and age according to the adult male unit scale, which is based on calories needed, an average dietary for families or groups of persons should be adjusted for specific needs. The amounts of specific foods recommended for a specific sex-age group for a restricted diet and for a minimum-cost diet were weighted according to the sex-age composition of the population of different income classes, and the total was divided by the number of adult male units in the population. For most foods the average per adult male unit for different income classes was affected very little by differences in the age composition, and a single average was taken as the standard for comparison with amounts actually purchased. Since the average quantity of milk varied considerably for different income groups, the specific average for each income class has been used for comparison.

[8] The data on which this chart is based have been published in earlier articles, viz, Diets of low-income families in New York City, Milbank Memorial Fund *Quarterly*, October 1933, and Diets of urban families with low incomes, ibid., October 1934.

compared readily with both the adequate and restricted standard for each food, as these are indicated in the chart. All foods are included except milk and cheese; the average supply of these is given in table 8.

Families in the five cities with $3 to $4, and $4 or more income per person per week had as much as, or more than, the adequate standard for all foods except dried legumes, dried fruits, and milk. The foods used in greatest excess of the required amounts were meat and fish, eggs, and sweets. Although substitution of milk and fresh vegetables for some of this excess would give a more liberal supply of calcium and vitamins, and although a less expensive diet could have been provided by using more dried fruits and legumes, the foods actually used would provide a satisfactory diet.

Families with lower incomes had the same type of diet as that of the higher-income families but used less of each kind of food, instead of reshaping their diet to insure adequate amounts of "protective" foods and to obtain the best nutritional values for their money. The average amounts of meat and fish, eggs, potatoes, and sugary foods reported by families with $2 to $3 and those on relief were considerably more than the *adequate* standard, but the amounts of milk, dried legumes, dried fruits, and cereals were less than the *restricted* standard, and the supplies of fresh and canned vegetables and fruits were only slightly above or about equal to the *restricted* standard.

Families with less than $2 per person per week had still less milk, fresh and canned vegetables and fruits, and did not increase their supply of dried legumes, dried fruits, or cereals.

The milk supply of families of different incomes is shown in table 8 in two ways—first, the average amount per adult male unit, and, second, the percentage of families having specified amounts per week per child under 17 years of age. Present nutritional standards emphasize the consumption of milk by adults. In the adequate standard dietary used for comparison, there is included a pint of milk a day for all adults, in addition to three-fourths of a quart or a quart for children, according to their age; in the restricted dietary there is a pint for children and women and a half pint for men. However, an inquiry as to who in the family drank milk indicated that most of the milk was consumed by the children. Nutritionally, it is of special importance to them and the adequacy of the supply for childrem seems the most significant consideration.

For every income class the average milk supply was less than the adequate standard per adult male unit. However, for families with $3 to $4 and with $4 or more per person per week, the supply exceeded the restricted standard and also was more than enough to provide a quart of milk a day for all children under 17 years of age. But as

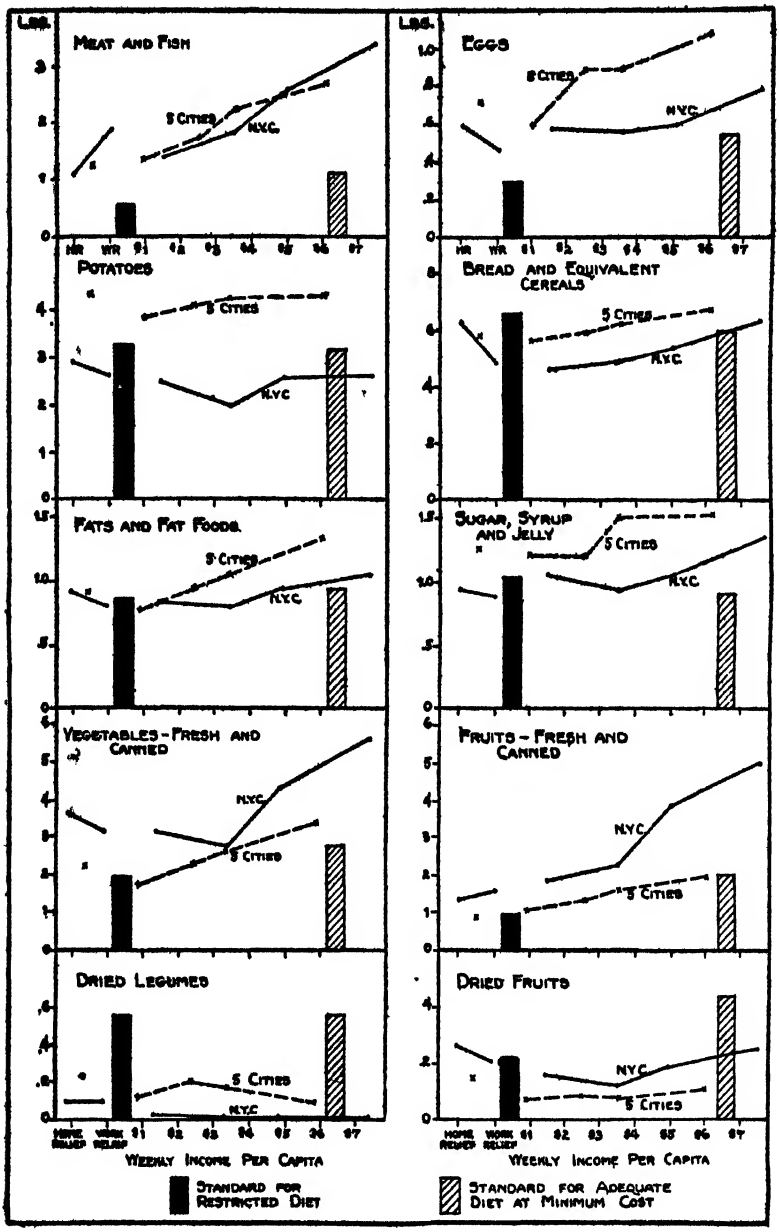

FIGURE 1 —Average number of pounds per week per adult male unit, of specific foods or groups of foods reported by families of different incomes in New York City, May-June 1933, and in a group of 5 large industrial cities, April-May 1933, compared with recommended amounts in 2 low-cost diets. The height of the bar indicates the recommended amount *its position on the income scale has no significance*

income decreased the amount of milk purchased decreased, and the average supply for the lower-income families was from 17 to 36 percent less than the restricted standard.

TABLE 8.—*Weekly milk supply of families according to income in Baltimore, Cleveland, Detroit, Pittsburgh, and Syracuse, April–May 1933*

Weekly income per capita	Quarts weekly per adult male unit			Number of families with children	Percent of families having specified quarts weekly per child under 17 years of age		
	Standard		Average for observed families[1]				
	Adequate	Restricted			Less than 3	3 to 5 9	6 or more
Relief	6 31	3 95	3 29	166	24 7	53 0	22 3
Under $2	5 98	3 76	2.42	75	46 7	33 3	20 0
$2 to $2 99	5 81	3 64	2 87	57	26 3	49 1	24 6
$3 to $3 99	5 83	3 72	3 80	41	12 2	39 1	48 8
$4 or more	5 46	3 55	4 06	100	12 0	30 0	58 0

[1] Includes fresh and canned milk and equivalent amounts of cheese

Considering the milk supply of individual families, we find that 25 percent of the relief families and 47 percent of families with income less than $2 purchased less than 3 quarts of milk per week for each child under 17 years of age; in these families, even if the children consumed all of the milk, they had less than the restricted standard for children. The percentage of families inadequately supplied with milk was much lower as family income increased. This is shown clearly in figure 3 as well as in table 8.

The shortage of milk is undoubtedly the most serious lack in the dietary of these families. As stated by Sherman,[9] "A liberal level of milk consumption is highly desirable for several reasons—among them, because it is the surest means of providing an adequate intake of calcium well balanced with desirable amounts of phosphorus, of protein, and of the vitamins." In the restricted standard dietary milk is the source of about two-thirds of the total calcium supply; the remainder is obtained largely from vegetables and fruits. Since the average supply of these foods was low, the calcium in the average diet of the relief families is from 5 to 10 percent less than the amount in this restricted dietary, and that in the average diet of families in the $2-income class was approximately 15 percent less. For families with income less than $2, not only is the calcium content of the diet approximately 25 percent less and the phosphorus content about 15 percent less than in the restricted dietary, but there is also a strong likelihood that vitamins A, C, and D are below the standard for safety.[10]

[9] Sherman, Henry C Chemistry of food and nutrition, p 292 The Macmillan Co , New York, 1932

[10] The data were incomplete with respect to the use of whole-grain cereals, and it is not possible to estimate the sufficiency of the supply of vitamin B.

New York City.—The average amounts of specific foods or groups of foods reported by families in each income class in New York City are shown in figure 1 and the milk supply is given in table 9.

TABLE 9.—*Weekly milk supply of families according to income in New York City, May–June 1933*

Weekly income per capita	Quarts weekly per adult male unit			Number of families with children	Percent of families having specified quarts weekly per child under 17 years of age		
	Standard		Average for observed families[1]				
	Adequate	Restricted			Less than 3	3 to 5.9	6 or more
Home relief	6.30	3.93	4.37	56	14.3	41.1	44.7
Work relief	5.96	3.71	3.80	27	14.8	37.0	48.1
Less than $3.00	5.80	3.72	3.97	37	13.5	27.0	59.5
$3 to $3.99	6.14	3.81	4.63	35	8.6	34.3	57.2
$4 to $5.99	5.58	3.74	5.29	64	4.7	26.6	68.7
$6 or more	5.16	3.40	5.16	56	3.6	7.1	89.3

[1] Includes fresh and canned milk and equivalent amounts of cheese.

A few general indications stand out clearly in this chart. For families in each income class the average supply of all foods except bread and cereals, potatoes, dried legumes, and dried fruits equaled or exceeded the *restricted* standard and, with minor exceptions, the *adequate* standard. The slight deficiency in the use of dried fruits was offset by a liberal use of fresh and canned fruits. While the amount of meat and fish purchased by families in the lower income classes was much less than that purchased by neighbors of high income, the average amount was twice as high as the restricted standard [11] and slightly above the adequate standard. Eggs were used also in greater amounts than required.

The work-relief families had a diet very similar to that of nonrelief families of lowest incomes, but in the diet of home-relief families the amounts of various foods were more nearly those recommended in the standard. Thus, the quantity of meat was less and the quantity of cereal foods and potatoes was more than that reported by other low-income families; the cheaper dried fruits were substituted to a greater extent for fresh and canned fruits.

The average milk supply of families with incomes of $4 to $6 per person per week was only slightly less than the *adequate* standard per adult male unit. For lower-income families and both relief groups the average amount equaled or exceeded the *restricted* standard for milk. As shown in figure 3 and table 9, the proportion of families with less than 3 quarts weekly per child was small, 14 percent

[11] The amount of meat and fish allowed by this restricted emergency diet is only a little more than half that allowed by some standard diets for relief families. Thus, the bulletin on Food Allowances, issued by the Temporary Emergency Relief Administration of New York, Aug. 15, 1932, recommended approximately 1 pound of meat and fish per equivalent adult male.

of the relief families and 15 percent of those with incomes of less than $3 per person. At every income level fewer New York City families were inadequately supplied than families in the "five cities."

The average dietary in New York City, even in the case of the lowest-income group, included at least the minimum provision of "protective" foods. The canvass period was, however, more favorable to the use of fresh vegetables and fruits than that in any other community in the study, since the market was supplied with a variety of fresh foods at reasonable prices late in May and in June. Nevertheless, because of its very low energy value, the average food supply of families with income less than $4 weekly per person was not nutritionally adequate. Less meat and more cereal foods, less of the relatively expensive fruits, and more dried legumes and dried fruits would have given better nutritional value for the same money.

Birmingham.—The average diet of families in each income class in Birmingham was very high in fatty foods and, except for relief families, in sugars, and moderately high in cereal foods, as shown in figure 2. Large quantities of eggs were included in the food supply of all but relief families, and they had slightly more than the restricted standard. The use of vegetables by relief families and those with income less than $2 per person per week was below the *adequate* but slightly above the *restricted* standard. Families with $2 to $3 per person per week and those of higher incomes had, on the average, quantities of vegetables and fruits that were adequate. Lean meat and fish were used in smaller quantities than by families of similar income in the northern cities in our study, but only the relief families had less than the restricted standard.

The milk supply of families with less than $4 per person per week averaged less than the restricted standard (table 10) and was about equal to an average of 1 pint daily per child under 17 years of age, with none for other members of the family. Relief families had an average of only half as much milk as the other low-income families and one-third the quantity in the restricted dietary. Most relief families were given canned milk; 1 family was given some fresh milk, 2 families had a little cash income during the week and bought milk, and 1 family kept a cow. Families with incomes of $4 or more had enough milk to provide a quart a day for the children, but less than the adequate standard.

The distribution of families according to the weekly milk supply shows that 70 percent of the families with a weekly income of $6 or more per person had 6 quarts or more per child under 17 years of age and only 12 percent had less than 3 quarts per child. Of the families with income less than $3 per person, 50 percent had less than 3 quarts per child per week.

TABLE 10.—*Weekly milk supply of families according to income in Birmingham, Ala., May 1933*

Weekly income per capita	Quarts weekly per adult male unit			Number of families with children	Percent of families having specified quarts weekly per child under 17 years of age		
	Standard		Average for observed families [1]				
	Adequate	Restricted			Less than 3	3 to 5.9	6 or more
Relief	6.08	3.87	1.47	24	83.3	16.7	0
Less than $2.00	5.69	3.72	2.85	14	50.0	28.6	21.4
$2 to $2.99	6.12	3.81	3.06	8	50.0	50.0	0
$3 to $3.99	5.82	3.73	3.19	10	30.0	30.0	40.0
$4 to $5.99	5.43	3.36	3.93	13	7.7	53.8	38.5
$6 or more	5.63	3.66	4.70	17	11.8	17.6	70.6

[1] Includes fresh and canned milk and equivalent amounts of cheese.

Although the average dietary of the families on very limited incomes probably provided approximately minimum amounts of the various essential nutrients, the excess amounts of fat meat and sweets and the very limited quantities of milk and vegetables make the dietary one of poor nutritional balance.

South Carolina cotton-mill villages.—Large quantities of flour and corn meal, lard and salt pork, and sugar were used by families of every income in the cotton-mill villages in South Carolina, as is evident from figure 2. Eggs were used in approximately adequate amounts by low-income families and in very large quantities by families in the higher income classes; little lean meat, fowl, or fish was used, and the average weekly amount for families with income less than $2 per person per week was only 0.44 pound per adult male unit, or 20 percent less than the restricted standard. Families with income less than $2 also used much less than the recommended quantity of fruits, either fresh or dried, but had nearly adequate amounts of fresh [12] and canned vegetables, and fully adequate quantities of dried legumes. As income increased, the use of fresh vegetables and fruits increased.

Except for families who owned a cow, the milk supply was not adequate. Families with incomes of $4 or more per person per week purchased an average amount slightly above the restricted standard, but lower income groups had much less milk, and those with less than $2 had less than half the restricted standard. Three-fourths of the families in this low-income group purchased less than 3 quarts of

[12] About one-half the families had turnip greens, lettuce, onions, or radishes from their own or a neighbor's garden and reported only that they had enough for "1 mess" or "2 messes", etc. Amounts were estimated arbitrarily on the basis of the number of persons in the family, which had the effect of eliminating differences between families in amounts used. It is believed that the estimates were conservatively low, and the garden produce thus estimated formed only a small part of the total for vegetables.

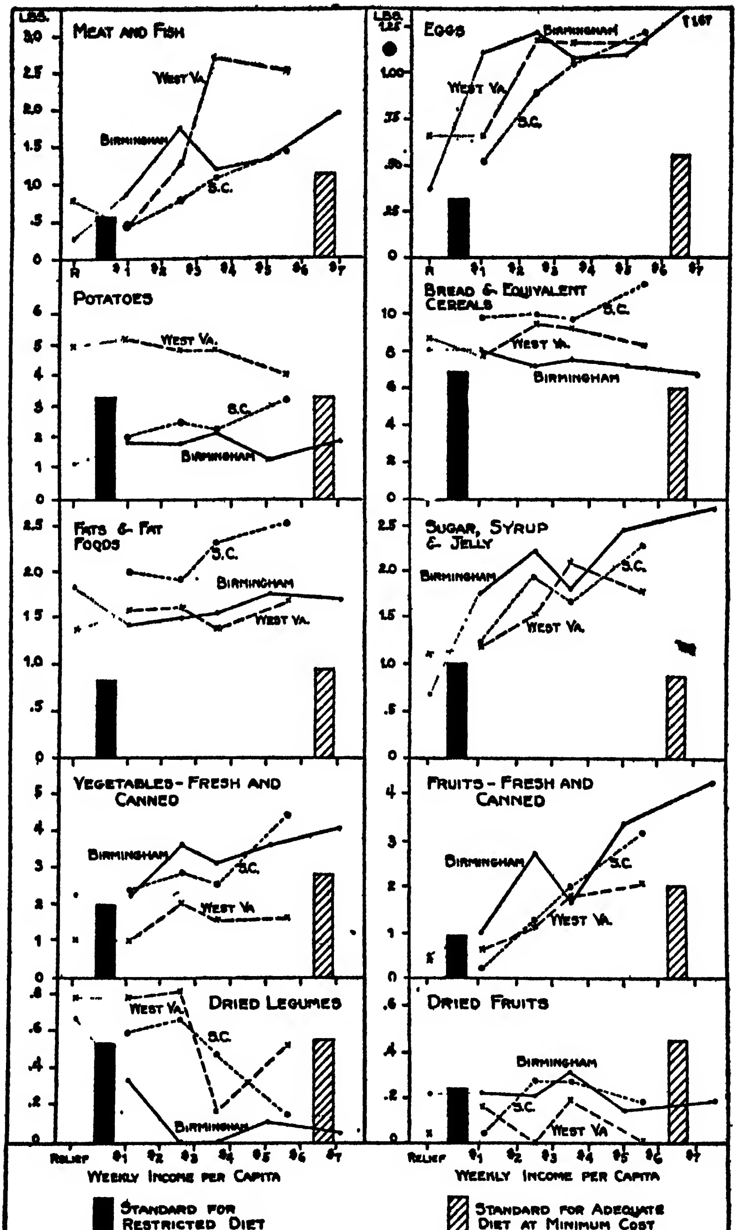

FIGURE 2.—Average number of pounds per week, per adult male unit, of specific foods or groups of foods reported by families of different incomes in Birmingham, cotton-mill villages in South Carolina, and mining towns in West Virginia, April-May 1933, compared with recommended amounts in 2 low-cost diets. The height of the bar indicates the recommended amount· *its position on the income scale has no significance.*

milk per week for each child under 17 years of age (table 11 and fig. 3). Among the 27 cow-owning families, only 4 had less than 6 quarts of milk per child per week.

Table 11.—*Weekly milk supply according to income of families which did not own a cow, in cotton-mill villages in South Carolina, May 1933*

Weekly income per capita	Quarts weekly per adult male unit			Number of families with children	Percent of families having specified quarts weekly per child under 17 years of age		
	Standard		Average for observed families[1]				
	Adequate	Restricted			Less than 3	3 to 5.9	6 or more
Less than $2 00	6.85	4 09	1 54	22	77 3	18 2	4.5
$2 to $2 99	6 29	4 00	2 13	24	70 8	20 8	8.3
$3 to $3 99	6 09	3 89	2 90	15	40 0	40.0	20.0
$4 or more	5 58	3 66	3 87	13	15 4	23 1	61.5

[1] Includes fresh and canned milk, equivalent buttermilk and butter, and equivalent cheese

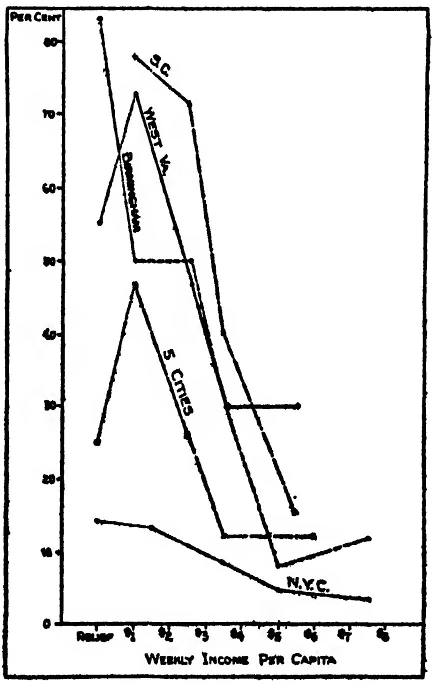

Figure 3.—Percent of families of various incomes which had a weekly milk supply of less than 3 quarts per child under 17 years of age in New York City, in a group of 5 large industrial cities, in Birmingham, in cotton-mill villages in South Carolina, and in mining towns in West Virginia in the spring of 1933.

It is of interest to compare the average food supply of these 102 mill-village families with that reported for approximately the same season by Goldberger, Wheeler, and Sydenstricker for 743 families in

1916. Average weekly supplies of various foods per adult male unit are shown in table 12. With respect to most basic items, including lard and fat meat, cereal foods, and lean meat, the amounts reported in the present study are strikingly similar to those found in the 1916 study. The quantity of sugar reported in 1933, however, is twice that of 1916. The supply of potatoes, fresh and canned vegetables, and fruits is about double that given for 1916 and probably reflects an improvement in the supplies in the local stores in addition to the omission in the 1916 study of home-produced vegetables. The milk supply also averaged about one-third more in 1933 than in 1916; this, in part at least, is a result of the fact that 27 percent of the families studied in 1933 owned a cow as against 20 percent in 1916. Eggs, also, were used in greater quantities than in 1916. The increased use of protective foods by the mill-village families is of particular interest, because pellagra is endemic in the mill villages, and educational campaigns on the relation of diet to pellagra have been carried on in recent years.

TABLE 12.—*Comparison of food supply in 1933 of families in cotton-mill villages in South Carolina with that in 1916* [1]

Article of food	Approximate pounds per week per adult male unit	
	102 households in 4 villages in 1933	743 households in 7 villages in 1916
Milk (quarts)	4.23	3.10
Meat, fowl, fish [2]	.98	.87
Eggs	.85	.59
Cheese	.08	.03
Fats	1.71	1.79
Cereals	7.91	8.18
Sugar	1.25	.64
Sirup and preserves	.47	.33
Potatoes, Irish and sweet	2.35	1.16
Vegetables, fresh and canned	2.81	1.46
Vegetables, dried	.46	.44
Fruits, fresh and canned	1.37	.65
Fruits, dried	.16	.13

[1] The 1916 data are from a study of the Relation of Diet to Pellagra Incidence, by Goldberger, Joseph, Wheeler, G. A., and Sydenstricker, Edgar. Pub. Health Rep., Mar. 19, 1920 (Reprint No. 587). The amounts given in the report (pp. 49 and 50 of the reprint) were average daily number of grams per adult male unit (Atwater scale), and these have been converted to pounds per week and adjusted for the average difference in the Atwater scale and the scale used in this study.

[2] Includes bacon, but not salt pork, and pork sausage, fresh and cured.

Coal-mining towns in West Virginia.—For families in each income class in the mining communities in West Virginia the average amounts of cereal foods, fats, sugar, potatoes, and dried vegetables were very large. These staple foods, together with a liberal supply of eggs, were the principal items in the dietary of this mining district. Families with income less than $2 per week per person and those receiving food relief had approximately one-half the restricted standard for fresh

and canned vegetables and fruits. Families in higher income classes also had less than the restricted standard of fresh and canned vegetables, but the supply of fruits equalled or exceeded this standard. Very little lean meat, less than the restricted standard, was used by the lowest-income families, but those with incomes of $4 or more had twice the adequate standard.

For no income group was the average supply of milk equal to the standard for a restricted dietary. Only 11 percent of families receiving free milk had 6 quarts a week per child, and 56 percent had less than 3 quarts.[13] When milk was not donated, less than 3 quarts per week per child was used by 73 percent of families with income less than $2 per week per person, and by 30 percent of the families with $3 or more (table 13).

TABLE 13.—*Weekly milk supply of families according to income in mining towns in West Virginia, April 1933*

Weekly income per capita	Quarts weekly per adult male unit			Number of families with children	Percent of families having specified quarts weekly per child under 17 years of age		
	Standard		Average for observed families [1]				
	Adequate	Restricted			Less than 3	3 to 5.9	6 or more
Under $3 (milk donated)	7 52	4 45	2 78	27	55 6	33 3	11.1
Under $3 (flour donated)	5 71	3 80	2 03	16	56 3	25 0	18.7
Under $2	7 25	4 24	1 82	11	72 7	27 3	0
$2 to $2 99	6 43	3 90	2 93	17	47 1	29 4	23.5
$3 or more	6 30	3 93	3 24	23	30 4	52 2	17.4

[1] Includes fresh and canned milk and equivalent amounts of cheese.

SICKNESS AND FOOD SUPPLY

No attempt has been made to correlate the family dietary with the sickness records obtained for the 3 months immediately preceding the health survey of which these data on food supply were a part. When the food records were collected, it was expected only that they would give an indication of whether nutritional deficiencies might be a factor contributing to ill health in these cities. Although housing and other factors in the standard of living also are adversely affected by low income, the very marked association between income and the adequacy of the diet and the well-known inverse correlation between income and the incidence of illness give good reason to believe that there is some association between sickness and diet.

The incidence of sickness in each surveyed city is given in a preceding report.[14] Sickness showed a consistent correlation with the eco-

[13] Milk was also given to many children at school, but the amounts were not recorded.

[14] Rates for various income and employment groups in each city are included in the first report in this series. See footnote 1.

nomic status of the families, the lower the income the higher the sickness rate, and also a striking association with unemployment, families with no employed workers having about 50 percent more cases of disabling illness than those with a full-time worker. These results are consistent with the situation found in the food supply, which, at income levels of less than $3 or $4 per person per week showed a marked tendency to be poorly balanced, to include less than "safe" requirements of milk and other "protective" foods, and to be insufficient in quantity. Sickness rates in the early spring of 1933 were highest in families with less than an annual income of $150 per person in 1932.

Specific food deficiency diseases were not found among the illnesses reported by the families surveyed in these cities, with the exception of some cases of pellagra in South Carolina. The relationship between the diet and sickness, if it is accepted that there was some association, would seem to be more a matter of lowered vitality and reduced resistance to disease.

SUMMARY

Records of a week's food supply for families at several low income levels or on relief in five large industrial cities, in New York City, in Birmingham, in South Carolina cotton-mill villages, and in a mining district of West Virginia were collected in the spring of 1933.

The average energy value of the food supply was nearly 20 percent below the adequate standard of 3,000 calories per day per adult male unit for families in the five cities with a weekly income of less than $2 per person, and about one-fourth of these families had less than 2,200 calories daily. The calorie supply was similarly low for families in New York City with incomes less than $4 weekly per person. Relief families, except those on work relief in New York City, had a higher average supply of calories than the poorest non-relief groups, but 25 percent in the five cities and 29 percent in New York had less than 2,200 calories per adult male unit. The average caloric value of the food supply of families at the lowest income levels in the other three communities equalled or exceeded the adequate standard, owing to the general use of large quantities of fat meat, flour or other cereal foods, and sugar.

A greatly diminished use of milk, vegetables, and fruits was associated with lower incomes in all the communities in the study. In the five cities the average supply of milk purchased by families with income less than $2 per capita per week was one-third less than minimum requirements, and average amounts of fresh and canned vegetables and fruits were about equal to minimum needs. Bread and cereals were also used in smaller amounts than is recommended for a low-cost diet. On the other hand, amounts of meat and fish, eggs, and sugary foods purchased, though less than amounts purchased

by higher-income families, exceeded the quantities recommended for an adequate low-cost diet. The result was a dietary low in calcium and vitamins.

In New York City the average dietary of the lowest-income families included adequate quantities of fresh and canned vegetables and minimum amounts of milk. However, the period of canvass in New York City extended later into the spring season than did that in the five cities. In these families which had a food supply with less caloric value than the minimum need, the use of such cheap high-caloric foods as bread and cereals, dried legumes, and potatoes was less than is recommended for a low-cost diet.

The families in the mining towns of West Virginia and the cotton-mill villages of South Carolina whose weekly income was less than $2 per person purchased less than half the requirements for milk in a restricted diet and also used too little fruit. The average amount of fresh and canned vegetables reported by families in the mining towns was below minimum requirements, and that for mill-village families approximately equalled the minimum requirements.

In Birmingham the food supply of the lowest-income families was deficient chiefly in milk.

(EXPLANATORY NOTE In this study all men and women from 18 to 59 years of age were counted as moderately active; for men and women 60 years of age or over the relative allowance used was 90 and 80, respectively, for those employed and 80 and 70, respectively, for those at home, and boys 16 or 17 years of age at work were given an allowance of 120 and those in school or at home 110 For men who were unemployed, throughout the week, the allowance is a little high, and for those employed at heavy work it is too low; but it did not seem practicable to attempt to make an adjustment for the amount of activity For average requirements of family groups, the adjustment would make very little difference, probably not more than 2 or 3 percent, in view of the large amount of part-time employment as well as unemployment and the fact that employed males comprise only 20 to 25 percent of the population For some individual families, the equivalent adult male requirement used is no doubt much too low)

DEATHS DURING WEEK ENDED JANUARY 4, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan 4, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,909	9,698
Deaths per 1,000 population, annual basis	13 8	13.5
Deaths under 1 year of age	598	610
Deaths under 1 year of age per 1,000 estimated live births	54	56
Data from industrial insurance companies:		
Policies in force	67,860,830	67,105,928
Number of death claims	11,468	10,739
Death claims per 1,000 policies in force, annual rate	8.8	8.3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Jan. 11, 1936, and Jan. 12, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 11, 1936, and Jan. 12, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan 11, 1936	Week ended Jan 12, 1935	Week ended Jan. 11, 1936	Week ended Jan 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935
New England States:								
Maine	4	2	5	3	235	12	0	0
New Hampshire					42	24	0	0
Vermont	2				117	4	0	0
Massachusetts	12	12			269	287	5	0
Rhode Island		6		5	138	13	0	0
Connecticut	4	4	1	239	87	429	1	0
Middle Atlantic States:								
New York	43	64	[1] 17	[1] 52	971	1,110	19	2
New Jersey	15	27	14	325	41	66	3	0
Pennsylvania	84	73			365	1,799	10	3
East North Central States:								
Ohio	45	67	14	990	73	586	6	10
Indiana	51	52	30	137	11	499	3	1
Illinois	77	45	57	227	57	1,760	13	3
Michigan	9	12	1	52	82	252	3	2
Wisconsin	2	6	35	30	77	626	2	2
West North Central States:								
Minnesota		7			122	1,199	1	2
Iowa	12	14	2	50	11	1,483	5	1
Missouri	37	39	215	364	16	193	1	1
North Dakota		1		7	27	203	1	0
South Dakota	1	8			26	58	0	0
Nebraska	9	4			79	172	0	4
Kansas	12	18	32	21	18	468	3	0
South Atlantic States:								
Delaware	1			11	203		0	0
Maryland [2] [3]	14	10	24	380	98	139	6	3
District of Columbia	22	6	1	22	2	9	5	0
Virginia	25	32			19	312	3	7
West Virginia	15	32	87	158	2	479	7	1
North Carolina	21	30	9	491	13	689	3	3
South Carolina [3]	1	5	401	1,832	7	7	0	0
Georgia [3]	13	10	276	1,944			3	1
Florida [3]	7	9	5	14	1	31	2	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 11, 1936, and Jan. 12, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935
East South Central States:								
Kentucky	32	38	79	316	83	650	8	4
Tennessee	37	28	131	387	1	42	10	5
Alabama [3]	20	20	352	521	21	143	4	3
Mississippi [2] [3]	6	15					1	0
West South Central States:								
Arkansas	16	20	94	161		26	8	0
Louisiana	13	49	15	16	23	56	1	1
Oklahoma [4]	15	17	183	120	1	23	16	3
Texas [3]	74	77	271	338	23	51	11	3
Mountain States:								
Montana		4	7	482	9	108	1	1
Idaho	2			4	61	11	0	0
Wyoming	1				4	12	0	0
Colorado	7	12			5	624	1	1
New Mexico	4	11	12	9	2	41	1	1
Arizona	7	1	95	67	1	8	3	0
Utah [3]					3	6	0	0
Pacific States:								
Washington		5		3	338	58	0	0
Oregon	12	1	24	96	686	40	0	0
California	32	49	63	142	733	144	4	2
Total	816	937	2,561	10,023	5,203	14,952	174	70
First 2 weeks of year	1,516	1,780	4,347	16,988	8,412	25,274	304	138

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935
New England States:								
Maine	1	0	15	22	0	0	0	1
New Hampshire	0	0	6	6	0	0	0	0
Vermont	0	0	12	27	0	0	1	0
Massachusetts	1	0	330	169	0	0	0	0
Rhode Island	0	0	26	14	0	0	1	0
Connecticut	0	0	78	61	0	0	3	3
Middle Atlantic States:								
New York	0	2	754	627	0	0	10	9
New Jersey	2	0	158	128	0	0	4	4
Pennsylvania	3	1	536	660	0	0	9	3
East North Central States:								
Ohio	1	3	346	805	0	2	3	4
Indiana	0	0	269		3	5	0	2
Illinois	0	0	708	748	19	0	5	5
Michigan	0	0	346	304	0	1	2	3
Wisconsin	0	0	495	585	13	21	1	0
West North Central States:								
Minnesota	0	0	358	147	7	3	1	0
Iowa	0	0	185	88	12	2	0	1
Missouri	0	0	273	81	0	5	1	7
North Dakota	0	0	104	78	16	0	0	0
South Dakota	0	0	100	18	27	14	0	1
Nebraska	0	0	160	67	56	39	1	0
Kansas	0	0	143	131	13	1	8	2
South Atlantic States:								
Delaware	0	0	15	13	0	0	0	1
Maryland [2] [3]	1	0	96	100	0	0	6	4
District of Columbia	0	0	24	27	0	0	5	0
Virginia	0	0	66	72	0	0	1	5
West Virginia	0	1	53	136	0	1	0	7
North Carolina	1	0	31	69	1	0	1	7
South Carolina [3]	2	0	6	9	0	0	0	1
Georgia [3]	0	0	18	20	4	0	3	4
Florida [3]	0	1	5	16	0	0	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 11, 1936, and Jan. 12, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 11, 1936	Week ended Jan 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935	Week ended Jan. 11, 1936	Week ended Jan. 12, 1935
East South Central States:								
Kentucky	0	0	86	92	1	0	7	12
Tennessee	1	0	50	61	0	1	0	4
Alabama [3]	0	0	24	24	0	0	2	1
Mississippi [2 3]	0	0	10	24	0	1	5	1
West South Central States:								
Arkansas	0	0	11	11	0	4	8	7
Louisiana	0	1	18	48	1	1	4	12
Oklahoma [4]	0	1	36	60	0	1	6	7
Texas [3]	0	3	90	53	0	4	4	46
Mountain States:								
Montana	0	1	211	23	34	0	2	1
Idaho	1	0	54	3	2	0	1	1
Wyoming	0	0	91	6	0	8	0	0
Colorado	0	0	167	269	0	4	0	0
New Mexico	0	0	37	23	0	0	6	3
Arizona	0	0	33	23	0	0	0	0
Utah [2]	0	0	97	26	0	0	0	0
Pacific States:								
Washington	0	3	69	48	31	109	2	1
Oregon	1	1	53	95	2	3	3	0
California	7	13	323	247	12	10	9	4
Total	22	31	7,176	6,364	254	240	121	179
First 2 weeks of year	43	60	13,217	11,664	417	415	220	387

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Jan. 11, 1936, 22 cases, as follows: Maryland, 1; South Carolina, 1; Georgia, 7; Florida, 1, Alabama, 9; Mississippi, 1; Texas, 2.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
December 1935										
Connecticut	2	24	44		382		6	191	0	4
Florida	1	45	12	214	3	1	0	31	0	8
Maine	1	11	5		878		16	103	0	11
Missouri	17	215	515	17	46		4	656	10	14
Nebraska	5	24			129		0	807	192	1
North Carolina	6	186	58		29	18	13	273	2	19
West Virginia	12	95	352		25		0	298	1	9
Wyoming		1	2		13		0	331	7	1

December 1935

	Cases
Chicken pox:	
Connecticut	663
Florida	23
Maine	271
Missouri	375
Nebraska	177
North Carolina	426
West Virginia	366
Wyoming	58
Dengue:	
Florida	1
Dysentery:	
Florida (amoebic)	
Missouri	
Epidemic encephalitis:	
Connecticut	1
Missouri	2
German measles:	
Connecticut	183
Maine	11
North Carolina	9
Mumps:	
Connecticut	325
Florida	37
Maine	678
Missouri	390
Nebraska	75
Mumps—Con.	
West Virginia	97
Wyoming	39
Ophthalmia neonatorum:	
North Carolina	2
Paratyphoid fever:	
Connecticut	2
North Carolina	1
Rabies in animals:	
Missouri	2
Rabies in man:	
North Carolina	

December 1935—Continued

	Cases
Rocky Mountain spotted fever:	
North Carolina	2
Septic sore throat:	
Connecticut	6
Maine	2
Missouri	72
Nebraska	2
North Carolina	15
Wyoming	18
Tetanus:	
Connecticut	2
Trachoma:	
Missouri	59
Trichinosis:	
Connecticut	3
Tularaemia:	
Missouri	1
Wyoming	1
Typhus fever:	
Florida	2
North Carolina	3
Undulant fever:	
Connecticut	8
Maine	1
Missouri	2
Undulant fever—Con.	
Nebraska	1
North Carolina	1
Vincent's infection:	
Maine	5
Whooping cough:	
Connecticut	336
Florida	18
Maine	212
Missouri	156
Nebraska	33
North Carolina	130
West Virginia	29
Wyoming	29

CASES OF VENEREAL DISEASES REPORTED FOR NOVEMBER 1935

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	802	2.96	278	1.03
Arizona	37	.81	120	2.63
Arkansas	212	1.13	106	.57
California	1,199	1.95	1,376	2.23
Colorado	37	.35	30	.28
Connecticut	181	1.09	158	.95
Delaware	142	5.87	46	1.90
District of Columbia	165	3.32	149	3.00
Florida	235	1.49	91	.58
Georgia	914	3.14	479	1.65
Idaho	0	0	0	0
Illinois	1,309	1.66	1,089	1.38
Indiana	215	.65	124	.38
Iowa [1]	102	.41	149	.60
Kansas	88	.46	65	.34
Kentucky	264	.99	214	.81
Louisiana [1]	128	.59	81	.37
Maine	47	.58	39	.49
Maryland	644	3.85	234	1.40
Massachusetts	464	1.07	476	1.10
Michigan	455	.89	489	.96
Minnesota	261	1.00	299	1.15
Mississippi	1,023	4.97	1,804	8.77
Missouri	815	2.22	690	1.88
Montana [1]	20	.37	36	.67
Nebraska	25	.18	67	.48
Nevada [2]	------	------	------	------
New Hampshire	15	.32	33	.70
New Jersey	535	1.26	313	.74
New Mexico [1]	51	1.17	28	.64
New York [1]	4,465	3.42	1,087	.83
North Carolina	1,304	3.95	467	1.41
North Dakota	25	.36	114	1.66
Ohio [1]	526	.77	257	.38
Oklahoma [1]	182	.74	153	.62
Oregon	52	.53	153	1.55
Pennsylvania	380	.39	188	.19
Rhode Island	134	1.90	61	.87
South Carolina [1]	281	1.61	347	1.98
South Dakota	6	.09	39	.55
Tennessee	887	3.31	813	3.04
Texas [1]	156	.26	46	.08
Utah [2]	------	------	------	------
Vermont	26	.72	37	1.02
Virginia	515	2.11	328	1.34
Washington	172	1.07	207	1.29
West Virginia	184	1.03	97	.54
Wisconsin [3]	28	.09	179	.60
Wyoming [2]	------	------	------	------
Total	19,708	1.57	13,636	1.09

[1] Incomplete. [2] Not reporting. [3] Only cases of syphilis in the infectious stage are reported.

Reports from cities of 200,000 population or over

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio	11	0.40	16	0.59
Atlanta, Ga	169	5.89	134	4.67
Baltimore, Md	359	4.35	139	1.68
Birmingham, Ala	123	4.36	136	4.82
Boston, Mass	157	1.99	182	2.30
Buffalo, N. Y	145	2.45	92	1.55
Chicago, Ill	809	2.27	805	2.26
Cincinnati, Ohio	54	1.16	39	.84
Cleveland, Ohio	251	2.70	98	1.05
Columbus, Ohio	26	.85	35	1.14
Dallas, Tex	123	4.25	10	.35
Dayton, Ohio	1	.05	0	0
Denver, Colo [4]	----	----	----	----
Detroit, Mich	263	1.52	280	1.62
Houston, Tex [5]	196	5.85	65	1.94
Indianapolis, Ind	24	.64	68	1.80
Jersey City, N. J	1	.03	0	0
Kansas City, Mo	66	1 57	10	.24
Los Angeles, Calif	518	3.62	409	2.86
Louisville, Ky	304	9.38	144	4.44
Memphis, Tenn	246	9.21	88	3.30
Milwaukee, Wis	6	.10	42	.69
Minneapolis, Minn	65	1.34	115	2.36
Newark, N. J.[4]	----	----	----	----
New Orleans, La	70	1.46	68	1.42
New York, N. Y	3,803	5.21	840	1.15
Oakland, Calif	21	.69	46	1.52
Omaha, Nebr	8	.36	6	.27
Philadelphia, Pa	210	1 06	32	.16
Pittsburgh, Pa	63	.92	41	.60
Portland, Oreg	40	1.27	88	2.80
Providence, R. I	65	2.51	27	1.04
Rochester, N. Y	70	2.08	66	1.96
St. Louis, Mo	520	6.22	522	6.25
St. Paul, Minn	33	1.17	35	1.24
San Antonio, Tex [3]	----	----	----	----
San Francisco, Calif	118	1.76	118	1.76
Seattle, Wash	139	3.66	149	3.92
Syracuse, N. Y. [6]	23	1.06	41	1.88
Toledo, Ohio	37	1.22	33	1.08
Washington, D. C.[7]	165	3.32	149	3.00

[3] Not reporting.
[4] No report for current month.
[5] Data for Jefferson Davis and Hermann hospitals; physicians are not compelled to report venereal diseases.
[6] Reported by Syracuse Free Dispensary.
[7] Reported by Social Hygiene Clinic.

WEEKLY REPORT FROM CITIES

City reports for week ended Jan. 4, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	1	2	0	0	0	0	10	28
New Hampshire:											
Concord	0	------	0	0	3	1	0	2	0	0	11
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	1	------	------	------	------	------	2
Burlington	0	------	0	0	0	1	0	0	0	0	18
Rutland	0	------	0	2	0	4	0	0	0	0	6
Massachusetts:											
Boston	0	------	1	28	39	61	0	19	0	6	270
Fall River	0	------	1	1	8	2	0	2	0	0	36
Springfield	1	------	0	0	6	4	0	0	0	12	52
Worcester	0	------	0	0	10	27	0	0	0	4	64
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	18
Providence	0	------	1	36	16	11	0	0	0	3	85
Connecticut:											
Bridgeport	0	1	1	0	7	6	0	0	1	0	44
Hartford	0	------	0	8	2	1	0	0	0	16	30
New Haven	0	------	1	0	7	0	0	1	1	9	75
New York:											
Buffalo	0	------	0	30	23	46	0	3	0	4	162
New York	34	21	------	212	------	171	0	------	3	64	------
Rochester	0	------	0	2	8	5	0	3	0	2	98
Syracuse	0	------	1	1	10	7	0	1	0	9	56
New Jersey:											
Camden	1	------	0	0	4	5	0	0	1	0	34
Newark	1	2	0	3	20	27	0	8	0	16	134
Trenton	0	1	0	0	2	0	0	4	0	2	46
Pennsylvania:											
Philadelphia	7	8	4	114	38	76	0	28	0	45	564
Pittsburgh	3	1	0	19	36	58	0	7	0	10	193
Reading	0	------	0	3	4	2	0	0	0	2	36
Scranton	2	------	------	8	0	4	0	------	0	0	------
Ohio:											
Cincinnati	14	------	4	0	13	10	0	7	0	1	140
Cleveland	5	38	2	5	33	20	0	13	0	31	230
Columbus	5	3	3	0	9	14	0	5	0	3	112
Toledo	0	------	------	19	4	1	0	8	0	0	70
Indiana:											
Anderson	0	------	0	0	2	2	0	0	0	2	8
Fort Wayne	3	------	0	0	2	5	0	1	0	0	23
Indianapolis	2	------	1	0	26	16	0	1	0	5	126
Muncie	0	------	0	0	2	2	0	2	0	0	13
South Bend	0	------	1	0	3	4	0	0	0	1	23
Terre Haute	0	------	0	0	0	2	0	0	0	0	23
Illinois:											
Alton	2	------	0	0	2	1	0	0	0	0	15
Chicago	13	8	1	11	71	207	0	38	1	126	710
Elgin	0	------	0	0	1	1	0	0	0	1	10
Moline	0	3	0	0	0	8	0	0	0	0	9
Springfield	0	------	0	0	3	4	0	0	0	0	26
Michigan:											
Detroit	6	------	4	10	52	54	0	13	0	70	319
Flint	1	------	------	2	7	9	------	------	------	7	32
Grand Rapids	0	------	0	2	1	13	0	1	0	6	38
Wisconsin:											
Kenosha	0	------	0	1	0	4	0	0	0	8	3
Milwaukee	1	2	2	4	11	38	0	3	0	76	114
Racine	0	------	0	0	0	16	0	0	1	5	11
Superior	0	------	0	0	0	3	0	0	0	0	8
Minnesota:											
Duluth	0	------	0	3	0	1	0	1	0	0	20
Minneapolis	0	------	1	10	11	118	0	2	1	0	117
St. Paul	1	------	0	12	8	25	0	1	1	4	64

City reports for week ended Jan. 4, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0			0		2	0		0	2	
Davenport	0			0		6	0		0	0	
Des Moines	2			0		4	0		0	1	30
Sioux City	1			0		6	1		0	0	
Waterloo	2			0		1	0		0	2	
Missouri:											
Kansas City	2		0	1	19	19	0	1	0	0	117
St. Joseph	0		0	1	2	3	0	1	0	0	17
St. Louis	5		1	4	17	36	0	8	0	3	263
North Dakota:											
Fargo	0		0	0	0	3	0	1	0	0	5
Grand Forks	0			0		0	0		0	0	
Minot	0		0	0	0	0	0	0	0	0	6
South Dakota:											
Aberdeen	0			0		1	0		0	0	
Nebraska:											
Omaha	1		0	7	13	101	6	1	0	0	71
Kansas:											
Lawrence	0		0	1	0	1	0	0	0	0	4
Topeka					2	6					10
Wichita	0		0	0	8	7	0	0	0	2	36
Delaware:											
Wilmington	1		0	2	2	1	0	0	0	2	29
Maryland:											
Baltimore	2	5	0	6	28	25	0	9	0	9	250
Cumberland	1		0	0	0	3	0	0	0	0	13
Frederick	0		0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	18	4	4	5	20	18	0	9	1	3	186
Virginia:											
Lynchburg	1		0	0	1	0	0	0	0	0	12
Richmond	0		0	2	8	6	0	3	0	1	71
Roanoke	0		1	0	2	3	0	0	0	0	16
West Virginia:											
Charleston	0		0	0	3	5	0	0	0	0	11
Huntington	0			0		3	0		0	0	
Wheeling	0		0	0	3	3	0	0	0	0	25
North Carolina:											
Gastonia	1		0	0	0	0	0	0	0	0	5
Raleigh	0		0	0	1	1	0	0	0	0	9
Wilmington	0		0	0	2	0	0	0	0	0	19
Winston-Salem	0	1	0	1	1	2	0	0	0	0	13
South Carolina:											
Charleston	0	23	1	1	5	1	0	1	0	0	32
Columbia					10						34
Florence	0		0	0	0	0	0	0	0	0	6
Greenville	0		0	1	2	0	0	0	0	0	7
Georgia:											
Atlanta	2	46	2	0	18	9	0	2	1	0	54
Brunswick	0	1	1	0	0	0	0	0	0	0	7
Savannah	1	33	4	0	8	6	0	0	0	0	60
Florida:											
Miami	1		0	1	1	2	0	2	0	0	40
Tampa	0	1	1	0	2	[illegible]	0	0	0	0	33
Kentucky:											
Ashland	1			0		0	0		0	0	
Covington	2		0	1	4	2	0	0	0	0	25
Lexington	0		0	0	3	2	0	2	0	0	26
Louisville	2	4	0	1	6	11	0	5	0	3	72
Tennessee:											
Knoxville	0	13	1	0	5	0	0	0	0	0	51
Memphis	5		5	0	15	8	0	7	0	1	115
Nashville	2		5	0	13	0	0	3	0	0	60
Alabama:											
Birmingham	4	9	2	0	16	3	0	5	0	0	88
Mobile	1	2	1	0	1	0	0	1	0	0	23
Montgomery	1	4		0		0	0		1	0	
Arkansas:											
Fort Smith	0			0		0	0		0	0	
Little Rock	0		0	0	7	6	0	0	0	0	7
Louisiana:											
Lake Charles	1		0	0	0	0	0	0	0	0	10
New Orleans	2	8	2	9	21	7	0	12	0	2	186
Shreveport	2		0	1	8	5	0	5	0	0	50
Oklahoma:											
Oklahoma City	1	17	0	0	6	6	0	1	0	3	43

City reports for week ended Jan. 4, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	4	2	1	0	12	3	0	2	0	0	78
Fort Worth	1		2	0	5	7	0	0	1	0	48
Galveston	1		0	0	1	3	0	1	0	0	14
Houston	5		1	1	9	2	0	2	0	0	80
San Antonio	8		2	0	14	3	0	8	0	0	85
Montana:											
Billings	0		0	0	3	30	0	0	0	1	8
Great Falls	0		0	0	0	4	0	0	0	3	2
Helena	0	1	1	2	1	1	0	0	0	0	6
Missoula	0		0	0	2	21	0	0	0	0	8
Idaho:											
Boise	0		0	7	2	6	0	0	0	0	14
Colorado:											
Colorado Springs	1		0	1	1	9	0	0	0	3	19
Denver	3		5	4	19	30	1	6	1	9	117
Pueblo	1		0	0	2	13	0	0	0	0	9
New Mexico:											
Albuquerque	0	2	0	0	3	14	0	4	0	3	19
Utah:											
Salt Lake City	0		0	1	2	49	0	1	0	7	38
Nevada:											
Reno											
Washington:											
Seattle	0		2	19	13	12	0	3	0	2	102
Spokane	0		0	5	5	3	1	0	0	1	32
Tacoma											
Oregon:											
Portland	0		1	135	9	18	0	1	1	2	87
Salem	0	1		0		0	0		0	0	
California:											
Los Angeles	7	26	3	56	31	42	1	21	1	22	351
Sacramento	2		0	0	10	22	0	2	0	2	40
San Francisco	2	8	0	83	23	32	0	7	2	8	193

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	0	1
Worcester	1	0	0
Rhode Island:			
Providence	2	2	0
New York:			
New York	11		0
Pennsylvania:			
Philadelphia	1	1	1
Pittsburgh	0	1	0
Ohio:			
Cincinnati	2	2	0
Cleveland	2	2	0
Indiana:			
Anderson	0	0	1
Indianapolis	1	0	0
Illinois:			
Chicago	4	4	0
Michigan:			
Detroit	1	2	0
Wisconsin:			
Milwaukee	1	1	0
Iowa:			
Des Moines	2	0	0
Missouri:			
Kansas City	2	0	0
St. Louis	2	0	0
Nebraska:			
Omaha	0	1	0
Maryland:			
Baltimore	7	6	0
District of Columbia:			
Washington	2	1	0
Virginia:			
Roanoke	0	1	0
Georgia:			
Atlanta	2	1	0
Tennessee:			
Knoxville	0	1	0
Memphis	1	0	0
Nashville	1	0	0
Alabama:			
Birmingham	1	0	0
Louisiana:			
New Orleans	1	0	0
Shreveport	0	2	0
Texas:			
Galveston	1	0	0
Houston	0	2	0
Colorado:			
Denver	2	0	0
New Mexico:			
Albuquerque	1	0	0
Washington:			
Seattle	1	0	0
Oregon:			
Portland	1	0	0
California:			
Los Angeles	7	3	4
San Francisco	0	1	0

Pellagra.—Cases: Charleston, S. C., 1; Atlanta, 2; Montgomery, 2; New Orleans, 1; San Francisco, 1.
Typhus fever.—Cases: Savannah, 1; Tampa, 1; Mobile, 2.

FOREIGN AND INSULAR

CUBA

Habana—Communicable diseases—4 weeks ended December 21, 1935.—During the 4 weeks ended December 21, 1935, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1		Scarlet fever	1	
Diphtheria	16	2	Tuberculosis	43	12
Leprosy	1		Typhoid fever	[1] 75	11
Malaria	[1] 229	2			

[1] Includes imported cases.

JAMAICA

Communicable diseases—4 weeks ended December 28, 1935.—During the 4 weeks ended December 28, 1935, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	3	6	Puerperal fever		1
Dysentery	10	9	Scarlet fever		1
Erysipelas	1	3	Tuberculosis	28	75
Leprosy		2	Typhoid fever	26	103

NORWAY

Arendal District—Scarlet fever.—According to a report dated December 17, 1935, an epidemic of scarlet fever had occurred in Arendal district in southern Norway, where between 90 and 100 cases had been reported. The disease is said to be of a mild form and no deaths had occurred.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevelance of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for December 27, 1935, pages 1834–1848. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued January 31, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Brazil—Bahia State—January Catuny.—During the month of December 1935, 20 cases of plague were reported in the neighborhood of January Catuny, Bahia State, Brazil.

Hawaii Territory—Hawaii Island—Hamakua District—Paauhau Sector.—On December 31, 1935, 1 plague-infected rat was reported in the Paauhau Sector, Hamakua District, Hawaii Island, Hawaii Territory.

Yellow Fever

Ivory Coast.—Yellow fever has been reported in the Ivory Coast, as follows: During December 1935, 1 fatal case at Indenie Circle; on November 8, 1935, 1 case with 1 death at Sassandra.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 39; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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PUBLIC HEALTH REPORTS

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SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES DURING THE THIRD QUARTER AND THE FIRST 9 MONTHS OF 1935 [1]

By DEAN K. BRUNDAGE, *Statistician, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

The rise in sickness incidence which was recorded for a group of 159,000 male industrial employees in the second quarter of 1935 did not extend into the third quarter of the year. For the 9 months as a whole (January to September, inclusive), however, the frequency of cases of illness causing disability for 8 consecutive calendar days or longer was higher than in the same period of 1934. It appears that a larger number of 8-day or longer disabilities per 1,000 men will be recorded for the year 1935 than occurred in 1934.

The chief reason for the higher disability rate in 1935 is to be found in an increased frequency of respiratory diseases. For each of the respiratory-disease categories listed in table 1, a higher rate is shown for the first 9 months of 1935 than for the corresponding period of 1934. Most marked was the increase in the incidence of influenza, the annual rate being 13.9 cases per 1,000 men during the first 9 months of 1935 as compared with 9.4 during the same period of the preceding year. That the influenza experience of the group of industrial workers under consideration was representative of the general experience among employed persons throughout the country is indicated by the statistics of influenza mortality for the many millions of wage-earners and their dependents who are insured in the industrial department of the Metropolitan Life Insurance Co. Mortality from influenza, according to the Metropolitan Co.'s records, was greater during the first 9 months of 1935 than in the same period of 1934. The company reports, however, that the excess was not marked, and has decreased as the year has progressed.[2]

[1] The report for the second quarter and the first half of 1935 was published in the Public Health Reports for Nov. 15, 1935, vol. 50, no. 46, pp. 1607–1610.

[2] Statistical Bulletin, Metropolitan Life Insurance Co., vol. 16, no. 10, October 1935, p. 4.

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TABLE 1.—*Frequency of disability lasting 8 calendar days or longer in the third quarter and in the first 9 months of 1935 compared with the corresponding periods of 1934 (male morbidity experience of industrial companies which reported their cases to the U. S. Public Health Service)* [1]

Diseases and disease groups which caused disability. (Numbers in parentheses are disease title numbers from the International List of the Causes of Death, fourth revision, Paris, 1929)	Annual number of disabilities per 1,000 men in—				
	Third quarter of—			First 9 months of—	
	1935	1934	5 years 1930–34	1935	1934
Sickness and nonindustrial injuries [2]	79.8	74.1	75.3	85.2	79.6
Nonindustrial injuries	12.9	15.0	13.4	10.8	12.2
Sickness [2]	67.9	59.1	61.9	74.4	67.4
Respiratory disease	15.8	15.9	16.3	30.4	23.0
Bronchitis, acute and chronic (106)	2.5	2.1	2.5	3.6	3.1
Diseases of the pharynx and tonsils (115a)	4.0	4.0	3.8	5.2	4.6
Influenza and grippe (11)	3.3	4.2	4.4	13.9	9.4
Pneumonia, all forms (107–109)	1.1	.9	.9	2.4	1.3
Tuberculosis of the respiratory system (23)	.8	.8	1.0	.9	.8
Other respiratory diseases (104, 105, 110–114)	3.6	3.9	3.7	4.4	4.2
Nonrespiratory disease	42.1	43.2	45.6	44.0	42.6
Diseases of the stomach, cancer excepted (117–118)	2.8	3.4	4.1	3.5	3.4
Diarrhea and enteritis (120)	1.4	1.5	1.6	1.0	1.2
Appendicitis (121)	4.2	4.6	3.8	4.0	4.3
Hernia (122a)	1.1	1.7	1.8	1.3	1.6
Other digestive diseases (115b, 116, 122b–129)	2.2	3.0	3.0	2.7	2.9
Rheumatic group, total	7.1	8.2	9.0	[illegible]	9.0
Rheumatism, acute and chronic (56, 57)	3.3	4.0	4.0	4.2	4.4
Diseases of the organs of locomotion (156b)	2.2	2.7	2.9	2.5	2.8
Neuralgia, neuritis, sciatica (87a)	1.6	1.5	2.1	2.2	1.8
Neurasthenia and the like (part of 87b)	1.1	1.0	1.2	1.1	.8
Other diseases of the nervous system (78–85, part of 87b)	1.2	1.3	1.3	1.1	1.4
Diseases of the heart and arteries and nephritis (90–99, 102, 130–132)	3.4	3.2	3.1	3.7	3.4
Other genito-urinary diseases (133–138)	2.8	2.4	2.4	2.7	2.4
Diseases of the skin (151–153)	3.3	2.3	2.7	2.7	2.6
Epidemic and endemic diseases except influenza (1–10, 12–18, 23, 37, 38, part of 39 and 44)	2.4	1.8	1.5	2.0	2.7
Ill-defined and unknown causes (200)	2.3	1.6	2.4	2.1	1.7
All other diseases (19–22, 24–32, 36, part of 39 and 44, 40–43, 45–55, 58–77, 88, 89, 100, 101, 103, 154–156a, 157, 162)	5.9	6.2	6.7	6.2	6.1
Average number of males covered in the record	160,169	157,771	151,895	158,576	154,125
Number of companies included	32	32	37	23	23

[1] In 1934 and 1935 the same companies are included. The rates for the third quarter of the years 1930–34 include 22 of these companies, which employed an average of 123,896 men during these months, or 82 percent of the 151,895 men representing the sample population for the 5-year average.
[2] Exclusive of disability from venereal diseases and a few numerically unimportant causes of disability.

For nonrespiratory diseases as a whole the incidence rate was almost the same in each of the periods under review. However, a small increase is shown both in the third quarter and in the first 9 months of 1935 in the frequency of diseases of the circulatory and of the genito-urinary systems. The prevalence of epidemic and endemic diseases exclusive of influenza also appears to have been somewhat greater in the first 9 months of 1935 than in the same period of the year before. However, a reduced incidence is shown in digestive diseases as a whole, and an appreciable decrease in the frequency of

nonindustrial accidents occurred in the third quarter and in the first 9 months of 1935 as compared with corresponding periods of 1934.

In general, the morbidity rates are indicative of relatively good health conditions during the first three quarters of 1935. Although the frequency of disabling sickness was somewhat greater than in 1934, the rate was below the average for the preceding 5 years. Brilliant results in comparison with those of the preceding year are not to be expected, because in 1933 and 1934 unusually low sickness incidence rates were recorded for the sample of the industrial population under consideration.

The sickness rates presented here are based on reports of cases causing disability for more than 1 week and for which cash benefits are paid from funds to which the employee, the employer, or both contribute. The venereal diseases and a few numerically unimportant causes of disability are not included.

The comparison of disability rates in 1935 with those in 1934 is based on the reports of identical companies, 32 in number, and the 5-year averages are based on the experience of almost the same employee groups. The reporting companies employ men in almost all parts of the country; however, a majority of the workers covered in the record live north of the Ohio and east of the Mississippi River.

DEATHS DURING WEEK ENDED JAN. 11, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan. 11, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	10,155	10,064
Deaths per 1,000 population, annual basis	14 2	14.0
Deaths under 1 year of age	614	652
Deaths under 1 year of age per 1,000 estimated live births	55	60
Deaths per 1,000 population, annual basis, first 2 weeks of year	14.0	13.8
Data from industrial insurance companies:		
Policies in force	67,874,415	67,078,894
Number of death claims	13,540	15,023
Death claims per 1,000 policies in force, annual rate	10 4	11.7
Death claims per 1,000 policies, first 2 weeks of year, annual rate	9.6	10.0

MORTALITY SUMMARY FOR LARGE CITIES, 1935

Number of deaths, death rates, and infant mortality for a group of 86 large cities in the United States for the 52-week period Dec. 30, 1934, to Dec. 28, 1935, and comparison with 1934

[From the Weekly Health Index, Bureau of the Census, Department of Commerce]

City	Total deaths [1]	Death rate (per 1,000 estimated population) [2]	Deaths under 1 year [1]	Provisional infant mortality rate 1935 [1, 3]	Infant mortality rate 1934	Actual mortality in calendar year 1934: Total deaths	Actual mortality in calendar year 1934: Death rate (per 1,000 estimated population) [4]	Actual mortality in calendar year 1934: Deaths under 1 year
Total (86 cities)	424,969	11.4	[illegible]	49	55	[illegible]	11.4	[illegible]
Akron	2,199	8.2	185	48	42	2,212	8.3	282
Albany	2,011	15.3	106	46	54	1,872	14.2	129
Atlanta	4,316	15.0	409	74	88	4,449	15.4	459
White	2,261	11.9	218	61	71	2,332	12.2	254
Colored	2,055	21.0	191	98	104	2,117	21.6	205
Baltimore	11,085	13.4	772	57	65	11,116	13.5	876
White	8,311	12.4	517	49	58	8,417	12.5	600
Colored	2,774	18.1	255	81	88	2,699	17.6	276
Birmingham	3,315	11.7	308	63	77	3,364	11.8	366
White	1,693	9.6	166	57	62	1,661	9.4	170
Colored	1,622	15.0	142	73	97	1,703	15.8	196
Boston	11,351	14.4	812	51	55	11,330	14.4	880
Bridgeport	1,570	10.7	76	31	46	1,620	11.0	116
Buffalo	7,164	12.1	518	52	56	7,183	12.1	576
Cambridge	1,417	12.4	128	55	47	1,328	11.7	102
Camden	1,586	13.3	168	58	57	1,649	13.8	168
Canton	1,178	10.6	199	56	58	1,116	10.2	108
Chicago	35,434	9.9	2,009	41	48	36,281	10.1	2,289
Cincinnati	7,110	15.3	467	64	64	7,236	15.5	472
Cleveland	9,965	10.7	614	42	45	9,870	10.[illegible]	635
Columbus	4,487	14.8	242	51	58	4,303	14.2	273
Dallas	3,135	10.8	360	68	71	3,154	10.8	371
White	2,356	9.5	249	57	62	2,312	9.3	246
Colored	779	18.0	111	119	103	842	19.5	125
Dayton	2,637	12.6	159	47	45	2,629	12.5	158
Denver	4,373	14.7	314	63	63	4,136	13.9	318
Des Moines	1,749	11.9	90	31	52	1,748	11.9	140
Detroit	13,582	7.6	1,158	44	50	13,058	7.3	1,247
Duluth	1,132	11.1	44	27	48	1,118	11.0	80
El Paso	1,438	13.2	274	101	104	1,601	14.7	283
Erie	1,354	11.3	75	36	40	1,252	10.4	84
Evansville	1,225	11.4	90	58	64	1,344	12.5	100
Fall River [5]	1,450	12.6	115	58	42	1,452	12.6	86
Flint	1,380	7.8	164	50	64	1,429	8.1	212
Fort Wayne	1,288	10.4	65	35	48	1,333	10.6	86
Fort Worth	1,916	11.0	170	62	66	1,860	10.7	193
White	1,541	10.2	140	57	56	1,436	9.6	136
Colored	375	18.2	30	100	111	424	18.2	57
Grand Rapids	1,757	10.0	155	57	48	1,652	9.4	129
Hartford	2,220	12.9	156	65	60	2,125	12.4	243
Houston	3,791	11.2	307	54	68	3,670	10.9	376
White	2,636	9.9	228	49	45	2,301	8.6	177
Colored	1,155	16.1	79	79	125	1,369	19.0	199
Indianapolis	5,411	14.2	354	61	67	5,247	12.9	389
White	4,504	13.6	299	59	64	4,416	13.3	325
Colored	910	19.4	55	79	91	831	17.7	64
Jersey City	3,481	10.8	275	41	45	3,568	11.1	308
Kansas City, Kans.	1,669	13.4	103	44	63	1,699	13.7	149
White	1,332	12.9	89	45	59	1,344	13.1	116
Colored	337	15.7	14	38	88	355	16.6	33
Kansas City, Mo	5,029	11.9	317	56	59	5,671	13.4	330
Knoxville	1,417	12.4	148	68	77	1,493	13.1	170
White	1,132	11.9	130	67	72	1,175	12.3	140
Colored	285	15.0	18	75	124	318	16.8	30
Long Beach	1,507	8.9	81	36	31	1,368	8.1	65
Los Angeles	15,931	11.0	868	51	53	15,079	10.4	923
Louisville	3,810	12.4	135	24	71	•4,644	15.1	374
White	2,891	11.1	106	21	68	3,629	13.9	311
Colored	919	19.2	29	40	91	1,015	21.2	63
Lowell [5]	1,333	13.3	116	58	63	1,343	13.4	109
Lynn	1,010	9.8	96	59	33	1,068	10.6	50
Memphis	4,349	16.3	402	88	112	4,712	17.6	517
White	2,319	14.0	215	78	92	2,378	14.4	257
Colored	2,030	19.8	187	108	142	2,334	22.[illegible]	[illegible]

See footnotes at end of table.

Number of deaths, death rates, and infant mortality for a group of 86 large cities in the United States for the 52-week period Dec. 30, 1934, to Dec. 28, 1935, and comparison with 1934—Continued

City	Total deaths	Death rate (per 1,000 estimated population)	Deaths under 1 year	Provisional infant mortality rate 1935	Infant mortality rate 1934	Actual mortality in calendar year 1934		
						Total deaths	Death rate (per 1,000 estimated population)	Deaths under 1 year
Miami	1,526	13.9	102	57	62	1,532	13.9	111
White	1,102	12.8	68	51	53	1,120	13.0	71
Colored	424	17.5	34	74	87	412	17.0	40
Milwaukee	5,051	8.8	412	44	45	4,890	8.0	401
Minneapolis	5,047	10.8	270	37	47	5,102	10.5	349
Nashville	2,734	17.8	250	75	87	2,636	16.7	281
White	1,776	15.4	188	76	85	1,676	14.6	204
Colored	958	22.4	62	72	93	960	22.4	77
New Bedford [1]	1,264	11.3	94	55	61	1,251	11.1	108
New Haven	2,069	12.8	85	39	35	2,088	12.9	107
New Orleans	7,883	16.4	683	76	82	7,734	16.1	720
White	4,698	13.8	317	60	64	4,609	13.5	341
Colored	3,185	22.9	366	99	109	3,125	22.5	379
New York	74,805	10.2	4,754	47	52	75,754	10.8	5,272
Bronx Borough	11,392	8.0	700	45	45	11,284	7.9	707
Brooklyn Borough	25,691	9.4	1,801	44	48	25,485	9.4	1,962
Manhattan Borough	27,425	15.9	1,670	53	62	28,412	16.4	1,953
Queens Borough	8,093	6.4	479	44	49	8,235	6.5	536
Richmond Borough	2,204	12.9	104	43	51	2,338	13.7	124
Newark, N. J.	4,780	10.6	380	50	45	4,771	10.6	343
Oakland	3,501	11.5	167	41	40	3,172	10.4	164
Oklahoma City	2,245	10.5	241	63	65	2,285	10.7	243
Omaha	2,946	13.4	173	41	48	2,873	13.0	203
Paterson	1,676	12.1	104	42	46	1,648	11.9	123
Peoria	1,407	12.4	97	51	59	1,342	11.8	111
Philadelphia	24,037	12.1	1,448	48	54	24,986	12.6	1,615
Pittsburgh	8,354	12.2	589	48	55	8,182	12.0	655
Portland, Oreg	4,025	12.8	138	33	36	3,686	11.7	146
Providence	3,136	12.2	216	46	50	3,068	11.9	249
Richmond	2,926	15.7	229	78	73	2,799	15.1	228
White	1,750	13.1	120	62	54	1,644	12.3	108
Colored	1,176	22.4	109	108	107	1,155	22.0	120
Rochester	3,616	10.7	224	45	42	3,572	10.6	208
St. Louis	10,463	12.5	615	45	61	11,757	14.1	761
St. Paul	3,094	11.0	150	31	43	3,171	11.2	200
Salt Lake City	1,792	12.2	174	51	48	1,731	11.8	158
San Antonio	3,100	12.3	497	78	109	3,359	13.3	606
San Diego	2,259	13.3	108	38	47	2,138	12.6	120
San Francisco	8,476	12.6	247	35	33	7,978	11.9	236
Schenectady	1,062	11.0	65	45	47	1,075	11.1	65
Seattle	4,565	12.0	176	36	41	4,496	11.8	203
Somerville	853	8.0	41	33	46	899	8.4	57
South Bend	962	8.4	94	58	36	875	7.7	54
Spokane	1,720	14.7	101	48	52	1,537	13.1	108
Springfield, Mass	1,770	11.4	130	54	52	1,712	11.0	127
Syracuse	2,419	11.1	163	45	48	2,490	11.4	170
Tacoma	1,417	13.0	60	31	45	1,482	13.6	87
Tampa	1,306	11.8	85	53	68	1,255	11.3	106
White	992	11.3	52	40	55	897	10.3	76
Colored	314	13.5	33	119	98	358	15.4	30
Toledo	3,584	11.8	238	53	53	3,705	12.2	231
Trenton	1,929	15.5	130	49	64	1,692	13.6	152
Utica	1,517	14.7	90	50	52	1,511	14.7	89
Washington, D. C	8,490	17.2	649	60	65	8,274	16.8	662
White	5,274	14.8	294	41	43	5,086	14.2	283
Colored	3,216	23.5	355	97	108	3,188	23.3	379
Waterbury	913	8.9	56	32	48	1,024	10.0	85
Wilmington, Del. [5]	1,301	12.2	112	66	55	1,612	15.2	117
Worcester	2,506	12.6	160	46	61	2,532	12.7	197
Yonkers	1,070	7.4	60	38	47	1,208	8.3	86
Youngstown	1,808	10.2	111	41	49	1,693	9.6	134

[1] Based upon telegraphic reports received each week from city health officers.
[2] Rates are based on calendar year.
[3] Infant mortality rate is based upon deaths under 1 year as returned each week, and estimated live births, 1935.
[4] Based upon deaths which occurred within the calendar year.
[5] Mortality rates based upon population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

NOTE.—For the cities for which deaths are shown by color, the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 18; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Lousiville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; Tampa, 21; and Washington, D. C., 27.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended January 18, 1936, and January 19, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 18, 1936, and Jan. 19, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 18, 1936	Week ended Jan. 19, 1935	Week ended Jan. 18, 1936	Week ended Jan 19, 1935	Week ended Jan 18, 1936	Week ended Jan. 19, 1935	Week ended Jan. [illegible], 1936	Week ended Jan. 19, 1935
New England States:								
Maine		4	4		243	190	0	0
New Hampshire	1	4		5	46	7	0	0
Vermont		1			85	7	0	0
Massachusetts	20	7			370	321	5	2
Rhode Island	1	6			159	25	2	0
Connecticut	5	11	13	96	68	529	1	1
Middle Atlantic States:								
New York	40	41	[1] 22	[1] 29	980	826	18	6
New Jersey	16	16	15	158	42	95	5	2
Pennsylvania	28	67			209	1,687	1	4
East North Central States:								
Ohio	33	27	75	57	85	430	8	2
Indiana	29	20	44	266	34	317	2	4
Illinois	50	48	67	146	41	1,533	11	10
Michigan	16	16	6	53	27	234	2	1
Wisconsin	5	1	45	56	114	817	0	2
West North Central States.								
Minnesota	2	8	1	1	122	1,195	1	1
Iowa	15	9	9	162	3	731	5	1
Missouri	28	50	212	458	33	278	5	0
North Dakota	7	7	17	68	8	106	0	0
South Dakota	1	3			28	37	1	0
Nebraska	8	4	2	1	27	[illegible]	2	0
Kansas	10	14	7	15	15	47	3	1
South Atlantic States:								
Delaware	2		1	6	137	1	0	0
Maryland [1]	13	7	27	603	143	38	3	3
District of Columbia	26	13	5	14	6	4	6	1
Virginia	21	34			69	647	2	8
West Virginia	20	31	148		13	816	4	4
North Carolina	31	29	13	403	21	559	2	1
South Carolina	1	5	480	1,069	5	19	2	0
Georgia [1]	13	15	284	657			3	2
Florida	18	4	5	108	1	11	3	1
East South Central States:								
Kentucky	20	20	24	209	55	376	7	1
Tennessee	22	25	260	224	9	32	16	3
Alabama [1]	21	11	313	893	20	218	1	0
Mississippi [1]	6	17					4	1

[1] of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 18, 1936, and Jan. 19, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan 18, 1936	Week ended Jan. 19, 1935	Week ended Jan. 18, 1936	Week ended Jan 19, 1935	Week ended Jan 18, 1936	Week ended Jan. 19, 1935	Week ended Jan. 18, 1936	Week ended Jan. 19, 1935
West South Central States:								
Arkansas	15	14	63	116	5	19	2	2
Louisiana	31	41	26	47	15	57	2	1
Oklahoma [4]	15	12	191	229	-------	7	10	3
Texas [3]	71	76	413	320	183	301	33	3
Mountain States:								
Montana	-------	3	8	731	7	288	1	0
Idaho	1	-------	1	12	59	15	0	0
Wyoming	1	1	-------	-------	-------	13	0	0
Colorado	10	6	-------	-------	5	477	5	0
New Mexico	-------	3	6	28	1	23	1	3
Arizona [3]	11	1	145	112	6	14	1	0
Utah [1]	-------	-------	-------	-------	4	8	0	0
Pacific States:								
Washington	5	-------	-------	-------	112	110	2	1
Oregon	1	2	27	184	386	22	1	0
California	56	52	93	252	933	148	9	4
Total	750	808	3,007	7,749	4,884	13,651	197	74
First 3 weeks of year	2,266	2,588	7,354	24,737	13,296	38,925	501	212

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan 18, 1936	Week ended Jan 19, 1935	Week ended Jan 18, 1936	Week ended Jan 19, 1935	Week ended Jan 18, 1936	Week ended Jan 19, 1935	Week ended Jan 18, 1936	Week ended Jan. 19, 1935
New England States:								
Maine	3	0	16	17	0	0	1	0
New Hampshire	0	0	7	15	0	0	0	0
Vermont	0	0	19	21	0	0	0	0
Massachusetts	0	0	328	193	0	0	1	2
Rhode Island	0	1	25	16	0	0	0	0
Connecticut	0	0	59	65	0	0	1	0
Middle Atlantic States:								
New York	5	0	824	692	0	0	6	7
New Jersey	1	0	226	164	0	0	1	2
Pennsylvania	2	3	368	701	0	0	8	5
East North Central States:								
Ohio	1	0	390	599	3	1	6	5
Indiana	0	0	312	197	3	0	1	3
Illinois	5	0	640	807	8	3	5	13
Michigan	0	0	317	308	1	0	2	1
Wisconsin	0	0	651	577	22	14	0	3
West North Central States:								
Minnesota	0	2	377	103	28	16	2	0
Iowa	0	0	221	58	15	0	6	5
Missouri	1	0	263	77	4	1	3	6
North Dakota	0	0	94	55	5	0	0	0
South Dakota	0	0	73	16	14	4	0	0
Nebraska	0	0	204	49	44	15	0	1
Kansas	0	0	218	105	30	3	5	3
South Atlantic States:								
Delaware	0	0	15	16	0	0	0	0
Maryland [3]	0	0	81	94	0	0	5	3
District of Columbia	0	0	26	25	0	0	6	2
Virginia	1	0	67	78	0	2	7	12
West Virginia	1	0	55	142	0	0	2	5
North Carolina	0	0	46	50	1	1	4	0
South Carolina	0	1	5	14	1	0	0	4
Georgia [3]	0	0	21	18	0	0	0	2
Florida	0	0	15	8	0	0	4	0
East South Central States:								
Kentucky	0	1	81	66	0	0	11	2
Tennessee	1	0	28	59	0	0	3	3
Alabama [3]	0	0	8	19	2	1	2	2
Mississippi [3]	0	0	10	16	0	1	1	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 18, 1936, and Jan. 19, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 18, 1936	Week ended Jan. 19, 1935	Week ended Jan. 18, 1936	Week ended Jan. 19, 1935	Week ended Jan. 18, 1936	Week ended Jan. 19, 1935	Week ended Jan. 18, 1936	Week ended Jan. 19, 1935
West South Central States:								
Arkansas	0	0	19	12	2	6	1	0
Louisiana	0	2	30	23	2	6	2	3
Oklahoma [4]	0	0	60	29	1	0	2	8
Texas [3]	0	3	120	92	2	6	9	19
Mountain States:								
Montana	0	0	219	12	31	1	0	0
Idaho	0	0	36	8	2	0	0	2
Wyoming	0	0	78	15	0	14	0	0
Colorado	0	0	142	219	11	1	0	0
New Mexico	1	0	31	27	0	0	3	4
Arizona [3]	0	0	41	37	0	0	0	1
Utah [2]	0	0	121	30	0	0	0	0
Pacific States:								
Washington	0	2	504	67	27	76	1	1
Oregon	0	0	50	79	2	5	0	2
California	1	15	398	264	2	9	2	6
Total	23	30	8,080	6,358	263	180	113	144
First 3 weeks of year	66	90	21,247	18,020	680	595	333	531

[1] New York City only
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Jan. 18, 1936, 22 cases, as follows: Georgia, 12; Alabama, 4; Texas, 5; Arizona, 1.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September 1935										
South Carolina		182	543	1,708	6		2	37	0	63
December 1935										
California	18	194	149	2	1,089	7	28	1,338	20	42
District of Columbia	11	148	3		11	1	0	66	0	12
Georgia	5	77	351	68	7	16	0	110	0	26
Iowa	7	92	1		23		10	694	32	17
Maryland	24	63	73	1	169		2	348	0	38
Michigan	13	107	19		141		0	1,291	3	20
New Hampshire		1					1	57	0	1
New Jersey	5	72	52	3	91		15	681	0	9
New Mexico	1	22	14	8	11	1	2	196	1	33
Ohio	26	250	208		377	2	1	1,752	6	16
Oklahoma [1]	45	73	352	76	7	4		128	1	21
Pennsylvania	16	260			794	16	16	2,126	0	56
South Carolina		110	254	215	6	28	4	26	0	3

[1] Exclusive of Oklahoma City and Tulsa.

Summary of monthly reports from States—Continued

September 1935

South Carolina:	Cases
Chickenpox	39
Dengue	8
Diarrhea	298
Epidemic encephalitis	2
Hookworm disease	67
Mumps	59
Ophthalmia neonatorum	19
Paratyphoid fever	5
Rabies in animals	49
Tularaemia	1
Typhus fever	6
Undulant fever	1
Whooping cough	80

December 1935

	Cases
Actinomycosis:	
Pennsylvania	1
Anthrax:	
Pennsylvania	1
Botulism:	
California	10
Chickenpox:	
California	1,956
District of Columbia	74
Georgia	124
Iowa	545
Maryland	381
Michigan	2,782
New Jersey	1,299
New Mexico	158
Ohio	2,645
Oklahoma [1]	61
Pennsylvania	4,251
South Carolina	94
Conjunctivitis, infectious:	
Georgia	1
Dengue:	
Georgia	13
Diarrhea:	
Ohio (under 2 years, enteritis included)	16
South Carolina	117
Dysentery:	
California (amoebic)	11
California (bacillary)	11
Georgia (amoebic)	4
Maryland	4
Michigan (amoebic)	1
New Jersey (amoebic)	2
New Mexico (amoebic)	2
New Mexico (bacillary)	2
Ohio (bacillary)	1
Oklahoma [1]	5
Pennsylvania (amoebic)	1
Epidemic encephalitis:	
California	7
Iowa	5
Maryland	1
Michigan	3
New Jersey	5

December 1935—Continued

	Cases
Epidemic encephalitis—Continued.	
Ohio	1
Pennsylvania	9
South Carolina	1
Food poisoning:	
California	53
Maryland	1
Ohio	3
German measles:	
California	346
Iowa	5
Maryland	22
Michigan	56
New Jersey	56
New Mexico	7
Ohio	36
Pennsylvania	217
Hookworm disease:	
Georgia	856
South Carolina	21
Impetigo contagiosa:	
Iowa	5
Maryland	32
Oklahoma [1]	1
Lead poisoning:	
Michigan	3
Ohio	13
Leprosy:	
California	1
Milk sickness:	
New Mexico	1
Mumps:	
California	1,012
Georgia	100
Iowa	914
Maryland	79
Michigan	474
New Jersey	651
New Mexico	175
Ohio	778
Oklahoma [1]	23
Pennsylvania	2,084
South Carolina	39
Ophthalmia neonatorum:	
California	1
Maryland	2
New Mexico	1
Ohio	61
Pennsylvania	11
South Carolina	7
Paratyphoid fever:	
California	3
Maryland	1
Puerperal septicemia:	
New Mexico	2
Ohio	1
Rabies in animals:	
California	67
Michigan	1
New Jersey	11
South Carolina	23
Rabies in man:	
Oklahoma [1]	1

December 1935—Continued

	Cases
Scabies:	
Maryland	1
Septic sore throat:	
California	18
Georgia	35
Maryland	9
Michigan	70
New Mexico	1
Ohio	107
Oklahoma [1]	17
Tetanus:	
California	3
Georgia	1
Maryland	1
Michigan	2
New Jersey	1
Ohio	1
Trachoma:	
California	7
Maryland	1
New Jersey	2
Oklahoma [1]	1
Pennsylvania	1
Trichinosis:	
California	2
Michigan	1
Pennsylvania	1
Tularaemia:	
Georgia	2
Maryland	13
Michigan	2
New Jersey	1
Ohio	34
Typhus fever:	
Georgia	43
Maryland	1
South Carolina	1
Undulant fever:	
California	12
Georgia	1
Iowa	11
Maryland	1
Michigan	4
New Jersey	1
Ohio	3
Oklahoma [1]	4
Pennsylvania	6
South Carolina	3
Vincent's infection:	
Maryland	9
Michigan	30
Whooping cough:	
California	516
District of Columbia	12
Georgia	28
Iowa	66
Maryland	136
Michigan	1,196
New Jersey	660
New Mexico	51
Ohio	[illegible]
Oklahoma [1]	13
Pennsylvania	1,600
South Carolina	60

[1] Exclusive of Oklahoma City and Tulsa.

WEEKLY REPORTS FROM CITIES

City reports for week ended Jan. 11, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	2	2	4	0	6	0	18	28
New Hampshire:											
Concord	0	------	0	0	1	0	0	0	0	0	13
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	0	------	0	0	0	0	0	0	0	0	3
Burlington	0	------	0	0	0	0	0	0	1	0	7
Rutland	0	------	0	1	1	4	0	0	0	0	4
Massachusetts:											
Boston	2	------	1	43	51	86	0	8	0	8	235
Fall River	2	------	0	0	5	4	0	1	0	0	35
Springfield	2	------	0	1	3	4	0	0	0	22	54
Worcester	0	------	0	3	8	23	0	2	0	20	52
Rhode Island:											
Pawtucket	------	------	------	------	------	------	------	------	------	------	------
Providence	0	------	0	32	13	15	0	3	0	8	80
Connecticut:											
Bridgeport	2	------	0	0	5	3	0	0	0	0	40
Hartford	0	------	0	1	6	5	0	0	0	5	57
New Haven	0	------	1	2	4	0	0	1	0	24	47
New York:											
Buffalo	1	------	2	16	21	72	0	10	0	14	155
New York	29	17	------	278	------	232	0	------	5	108	------
Rochester	0	------	0	0	8	1	0	1	1	1	91
Syracuse	0	------	0	21	6	10	0	0	0	22	53
New Jersey:											
Camden	3	------	0	0	9	2	0	0	0	[illegible]	36
Newark	0	7	2	5	12	47	0	7	0	34	127
Trenton	0	------	0	0	8	3	0	3	0	0	61
Pennsylvania:											
Philadelphia	9	6	4	182	65	86	0	28	1	75	612
Pittsburgh	7	------	2	21	31	85	0	6	0	82	190
Reading	1	------	0	0	3	2	0	1	0	0	38
Scranton	1	------	------	30	------	4	0	------	0	2	------
Ohio:											
Cincinnati	11	------	2	0	15	19	0	8	0	2	140
Cleveland	1	43	2	18	26	35	0	18	0	56	230
Columbus	0	2	2	0	16	12	0	0	0	5	90
Toledo	1	2	2	21	10	12	0	1	0	14	87
Indiana:											
Anderson	0	------	1	0	1	3	1	0	0	3	13
Fort Wayne	4	------	0	0	2	2	0	0	0	0	20
Indianapolis	5	0	4	2	35	20	0	10	0	15	143
Muncie	0	------	0	1	1	2	0	0	0	0	9
South Bend	0	------	0	0	3	5	0	0	0	0	12
Terre Haute	0	------	0	0	0	1	0	0	0	0	25
Illinois:											
Alton	0	------	0	0	4	4	0	1	0	6	13
Chicago	16	8	3	21	62	212	0	34	0	202	865
Elgin	0	------	0	0	0	0	0	0	0	1	9
Moline	0	3	0	0	1	1	0	0	0	0	10
Springfield	------	------	------	------	------	------	------	------	------	------	------
Michigan:											
Detroit	4	6	3	15	49	89	0	15	0	186	302
Flint	2	------	0	1	8	14	0	0	0	13	28
Grand Rapids	0	------	3	4	4	11	0	0	0	10	33
Wisconsin:											
Kenosha	0	------	0	0	0	3	0	0	0	6	6
Milwaukee	0	1	1	3	9	93	0	2	0	85	102
Racine	0	1	1	1	1	24	0	0	0	1	17
Superior	0	------	0	1	0	1	0	0	0	0	6
Minnesota:											
Duluth	0	------	0	1	1	2	0	2	0	1	20
Minneapolis	0	------	2	41	13	146	0	2	0	11	113
St. Paul	0	------	0	16	18	31	0	0	0	9	76
Iowa:											
Cedar Rapids	1	------	------	1	------	0	0	------	0	4	------
Davenport	2	------	------	0	------	7	0	------	0	0	------
Des Moines	0	------	------	3	6	2	0	3	0	0	45
Sioux City	1	------	------	0	------	7	0	------	0	1	------
Waterloo	3	------	------	0	------	4	0	------	0	0	------

City reports for week ended Jan. 11, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Missouri:											
Kansas City	1		0	1	22	18	0	6	0	3	150
St. Joseph	0		0	2	4	3	0	0	0	0	18
St. Louis	20		4	3	31	53	0	7	0	2	250
North Dakota:											
Fargo	0		1	0	1	15	0	0	0	0	13
Grand Forks	0			0		0	0		0	0	
Minot	0		0	1	0	12	0	0	0	0	4
South Dakota:											
Aberdeen	0			0		2	0		0	0	
Nebraska:											
Omaha	8		1	3	10	103	14	2	0	6	74
Kansas:											
Lawrence	0		0	0	0	2	0	0	0	0	
Topeka											
Wichita	2		0	1	4	20	0	0	1	3	31
Delaware:											
Wilmington	0		0	1	5	8	0	2	0	7	35
Maryland:											
Baltimore	4	4	2	1	32	30	0	14	3	20	265
Cumberland	2		0	0	3	3	0	1	0	0	18
Frederick	0		0	0	0	1	0	0	0	0	4
District of Columbia:											
Washington	22		2	2	20	24	0	15	5	1	193
Virginia:											
Lynchburg	1		1	0	4	2	0	0	0	9	10
Norfolk	1		0	0	5	2	0	3	0	0	31
Richmond	2		0	0	10	9	0	4	0	0	76
Roanoke	0		0	0	3	1	0	0	0	0	21
West Virginia.											
Charleston	1		0	0	7	2	0	0	0	0	46
Huntington	0			0		1	0		0	0	
Wheeling	0		0	1	2	1	0	0	0	0	22
North Carolina:											
Gastonia	0		0	1	1	0	0	0	0	0	10
Raleigh	0		0	0	1	0	0	0	0	0	18
Wilmington	0		0	0	5	0	0	0	0	0	13
Winston-Salem	0	2	0	2	9	2	0	1	0	0	22
South Carolina:											
Charleston	0	20	0	0	3	3	0	0	0	0	22
Columbia	0		0	0	4	0	0	2	0	0	17
Florence	0		0	0	3	0	0	0	0	0	7
Greenville	0		0	2	3	1	0	0	0	0	12
Georgia:											
Atlanta	3	63	4	0	19	6	0	8	0	0	123
Brunswick	0		0	0	5	1	0	0	0	0	10
Savannah	0	15	9	0	6	5	0	1	0	0	57
Florida:											
Miami	1	1	0	0	5	1	0	2	1	0	46
Tampa	0		0	0	3	4	0	3	1	0	44
Kentucky:											
Ashland	0			0		2	0		0	0	
Covington	1		0	0	4	5	0	0	0	1	21
Lexington	0		0	0	5	1	0	2	0	0	22
Louisville	1		2	4	15	10	0	4	1	0	87
Tennessee:											
Knoxville	1	5	2	2	4	2	0	0	0	0	25
Memphis	2		1	0	15	7	0	10	0	0	114
Nashville	0	3	1	0	23	8	0	2	0	3	80
Alabama:											
Birmingham	2	9	1	0	12	7	0	6	0	1	68
Mobile	0	6	0	0	4	1	0	1	0	0	25
Montgomery	1	4		0		0	0		0	1	
Arkansas:											
Fort Smith	0	6		0		1	0		0	0	
Little Rock	1		0	0	0	1	0	2	0	0	
Louisiana:											
Lake Charles	1		0	0	0	0	0	0	0	0	7
New Orleans	6	4	3	15	26	11	0	9	2	10	183
Shreveport	0		0	0	13	3	0	0	0	0	44
Texas:											
Dallas	3	2	2	0	15	12	0	3	0	1	70
Fort Worth	2		1	2	2	8	0	3	0	0	40
Galveston	2		0	1	0	5	0	3	0	0	21
Houston	5		3	0	11	6	0	3	0	0	98
San Antonio	3		1	2	18	3	0	11	0	0	91

City reports for week ended Jan. 11, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	0	------	0	0	1	44	0	0	0	2	7
Great Falls	0	------	0	0	1	5	0	0	0	6	10
Helena	0	------	0	0	1	4	0	0	0	0	9
Missoula	0	------	0	0	2	19	0	0	0	0	7
Idaho:											
Boise	0	------	0	6	1	6	0	0	0	0	6
Colorado:											
Colorado Springs	0	------	0	0	3	4	0	1	0	1	16
Denver	1	------	1	5	19	22	0	6	0	9	111
Pueblo	0	------	1	0	2	23	0	1	0	0	15
New Mexico:											
Albuquerque	0	------	1	0	4	16	0	2	0	0	16
Utah											
Salt Lake City	0	------	0	3	5	55	0	0	0	7	41
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	1	------	8	17	9	40	4	5	1	10	103
Spokane	0	------	0	4	5	4	0	1	0	9	41
Tacoma	0	------	0	0	4	3	0	1	0	1	29
Oregon:											
Portland	0	2	1	135	8	14	0	2	0	2	85
Salem	0	------	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	7	24	1	83	27	48	0	25	0	19	386
Sacramento	5	------	1	5	0	26	0	3	0	21	34
San Francisco	0	------	1	77	17	41	1	14	0	10	199

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	0	2
Fall River	0	0	1
Worcester	0	1	0
Rhode Island:			
Providence	0	1	0
Connecticut:			
Hartford	0	1	0
New York:			
Buffalo	1	1	0
New York	18	------	0
New Jersey:			
Newark	0	1	0
Pennsylvania:			
Philadelphia	1	1	0
Pittsburgh	3	0	0
Ohio:			
Cincinnati	3	2	0
Cleveland	1	0	0
Indiana:			
Indianapolis	1	0	0
Illinois:			
Chicago	8	2	0
Michigan:			
Detroit	1	0	0
Minnesota:			
Duluth	1	0	0
Iowa:			
Davenport	1	1	0
North Dakota:			
Fargo	0	1	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maryland:			
Baltimore	9	3	0
District of Columbia:			
Washington	5	3	0
Georgia:			
Atlanta	1	0	0
Florida:			
Miami	1	1	0
Tennessee:			
Knoxville	2	0	0
Memphis	4	1	0
Alabama:			
Birmingham	1	1	0
Arkansas:			
Fort Smith	1	0	0
Louisiana:			
New Orleans	1	0	0
Shreveport	0	2	0
Texas:			
Dallas	1	1	0
Houston	2	2	0
San Antonio	0	1	0
Colorado:			
Denver	1	0	0
Washington:			
Spokane	1	0	0
California:			
Los Angeles	1	2	4
Sacramento	1	1	0
San Francisco	0	0	1

Epidemic encephalitis.—Cases: San Francisco, 1.
Pellagra.—Cases: Los Angeles, 1; San Francisco, 1.
Typhus fever.—Cases: Charleston, S. C., 1; Atlanta, 1; Savannah, 2.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended December 28, 1935.—During the 2 weeks ended December 28, 1935, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia[1]	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				2	1					3
Chickenpox		31	1	466	613	88	51	11	151	1,412
Diphtheria		7	11	50	21	10	2		1	102
Dysentery				8	1					9
Erysipelas				8	6	6	1	1	3	25
Influenza		11			9	5			2	27
Measles	12	81	3	619	1,788	216	430	67	408	3,624
Mumps		65			432	127	646	9	193	1,472
Paratyphoid fever					4					4
Pneumonia		1			32		2		12	47
Poliomyelitis				2	1	1		2		6
Scarlet fever		54	11	294	453	62	31	55	60	1,020
Smallpox									1	1
Trachoma						1	1			2
Tuberculosis	4	21	15	105	75	14	115	2	18	369
Typhoid fever			4	24	9				2	39
Undulant fever					4				1	5
Whooping cough	3	50	3	136	346	30	61	1	8	638

[1] The report for Nova Scotia includes the 3 weeks ended Dec. 31, 1935.

ITALY

Communicable diseases—4 weeks ended September 15, 1935.—During the 4 weeks ended September 15, 1935, cases of certain communicable diseases were reported in Italy as follows:

Disease	Aug. 19–25		Aug. 26–Sept. 1		Sept. 2–8		Sept. 9–15	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	43	32	45	38	54	44	42	36
Cerebrospinal meningitis	5	4	4	4	3	3	3	2
Diphtheria and croup	419	224	353	188	410	213	365	204
Dysentery	52	33	23	14	30	19	39	26
Hookworm	25	7	14	8	5	4	10	7
Lethargic encephalitis			1	1	2	3	1	1
Measles	461	186	427	161	437	150	324	135
Paratyphoid fever	186	128	177	127	189	118	148	92
Poliomyelitis	20	19	25	19	28	25	19	14
Puerperal fever	41	37	36	24	20	20	41	30
Rabies							1	1
Scarlet fever	264	121	252	125	319	145	294	142
Typhoid fever	1,336	568	1,464	573	1,157	609	1,288	574
Undulant fever	82	35	33	30	23	22	41	32
Whooping cough	310	114	226	95	203	78	213	93

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 26–June 29, 1935	June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28	Week ended— Oct. 1935: 5	Oct. 12	Oct. 19	Oct. 26	Nov. 1935: 2	Nov. 9	Nov. 16	Nov. 23	Nov. 30	Dec. 1935: 7	Dec. 14	Dec. 21	Dec. 28
China:																		
Amoy	C		1															
India	C	24,379	25,494	57,713	51,707	9,501	8,050	6,467	5,864	6,397	4,496	5,553	4,302					
	D	13,840	13,286	29,945	24,303	4,594	4,150	3,281	3,014	3,239	2,246	2,980	2,258					
Assam	C	1,212	250	1,706	585		74	35	55	54	74	125	198	207	204	164	211	198
	D	666	146	871	286		37	16	26	29	30	62	123	112	103	104	100	80
Bassein	C	4																
	D	1																
Bombay Presidency	C	216	1,328	6,236	7,779	1,284	708	695	631	559	477		510	346	387	357	[illegible]	[illegible]
	D	84	528	2,687	3,328	620	323	287	280	252	195		249	181	188	165	[illegible]	[illegible]
Bombay	C		7	6	3							[1] 1						
Calcutta	C	704	522	216	119	13	30	28	19	22	19	40	33	30	34	39	[illegible]	[illegible]
Central Provinces and Berar	C	4,622	3,732	7,243	11,774	2,472	1,723	1,580		535	457	196	102	30	47	40	[illegible]	[illegible]
Chittagong	C	29	8	7							1							
Cochin	D			1	11	5	4											
Madras Presidency	C	2,583	2,972	7,487	8,185	1,556	1,261	800	1,031	1,108	953	894	1,052			467	[illegible]	[illegible]
	D	1,162	1,264	3,249	3,482	689	581	378	408	502	486	408	501			220	111	[illegible]
Madras	C	15	84	137	31	2	2	2	2			1	7	4	3	5	[illegible]	[illegible]
	D	5	23	57	15				1				1	3	4	2	1	
Moulmein	C	18		1														
Negapatam	C																4	[illegible]
	D																2	[illegible]
Northwest Frontier Province	C			80	338	10		2										
	D			36	174	7	2	2										
Punjab	C	142	252	516	302	17	25	63	49	23	1							[illegible]
Rangoon	C	6	3			[illegible]				[1] 1								
Vizagapatam	C			1														
India (French):																		
Chandernagor	C	7	7	16	1													
Karikal	C					1			3	1				11				
Pondicherry	C	6		30	33	16				1				4				

Indochina (see also table below):																		
Pnom-Penh	C	1		1				1										
Varela	C	1																
Philippine Islands:																		
Occidental Negros Province	C			1														
	D			1														
Rizal Province	C	3		1														
	D	1																
Siam:																		
Ang Thong Province	C					2	2	1	5	1			1	1				
	D					2	2	1	4	1			1	1				
Ayudhaya Province	C				46	7	2	8	13	5	8	8	4			11	17	12
	D				31	6	1	7	11	4	7	4	1			6	19	10
Bangkok	C			1	43	12	12	8	12	10	13	18	18	18	16	5	14	14
Beirpuri Province	C			13	14	3	1		10				3					
Chhaxoengsao Province	C															3	25	27
Jalapuri Province	C																	3
Kanchanapuri Province [2]	C		6	9														
Lobpuri Province	C																9	1
Nagara Pathom Province	C								11	6	12	3	4		1			
Nondpuri Province	C				2		2	6				6	6	7	3			
Prachinpuri Province	C													14	17	9	4	24
Pradumdhani Province	C					1		4	1	1			1		1			
Rajpuri Province	C			72	107	15	2	1		6	8	2	11	9	16	10	18	12
Sarapuri Province	C						3	1	2	13	2	1	1					
Singhapuri Province	C						1	7	3	10	1	4						2
Smudprakar Province	C				5		4	1		2		8		1	8		20	21
Smudsagara Province	C			7	9	3	4	1	1	1	1	1		4	11	4	1	20
Smudsongram Province	C			51	56	5	2	12	4	2	11	11	7	3	6	7	12	13
Subarnpuri Province	C										12	1	3	2				
On vessels:																		
S. S. *Bodnant* at Calcutta	C																	
S. S. *Baron Napier* at Calcutta	C																	
S. S. *Barjora* at Calcutta	C	1																
S. S. *Rajula* at Penang	C	[3] 1																
S. S. *Rajput* at Calcutta	C	1																
S. S. *Santhia* at Rangoon from Calcutta	C		1															
S. S. *Kuala* at Penang from Moulmein	C		1															
S. S. *Cape St. Francis* at Rangoon from Calcutta	C		1															
S. S. *Cape St. Andrew* at Calcutta	C		1															

[1] Imported.
[2] During the period Apr. 20 to July 9, 1935, 98 cases of cholera with 95 deaths were reported in Kanchanapuri Province, Siam.
[3] Suspected.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

Place		July 1935			August 1935			September 1935			October 1935			November 1935		
		1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30
Indochina (French) (see also table above):																
Cambodia [4]	C											1				1
	D											1				
Cochinchina [4]	C	2		2			3		1			1			1	1
	D	2		2			2		1			1			1	

[4] Reports incomplete.

PLAGUE[1]

[C indicates cases, D, deaths, P, present]

Place		May 26-June 29, 1935	June 30-July 27, 1935	July 28-Aug 31, 1935	Sept 1-28	Week ended— October 1935				November 1935					December 1935			
						5	12	19	26	2	9	16	23	30	7	14	21	28
Algeria: Philippeville	C								3									
Argentina (see also table below).																		
Pampa Territory:																		
Leventue.[3]																		
San Luis.[3]																		
Azores. (See table below.)																		
Belgian Congo	C		3	2	2	1												
Plague-infected rats								3										
Bolivia. (See table below.)																		
Brazil.[4]																		
British East Africa:																		
Kenya	C	4	21	26	[illegible]	3	2	2	3	2	2	1	1	1	3	19	1	
Uganda	C	340	240	231	188	45	40	68	50	49	50	56	69	57	26	21		
	D	324	215	226		42	37	62	47	46	40	35	50	51	20	19		

Ceylon:																		
Balapitiya	C												1					
Colombo	C	3	5	4	11	5		1				2	1	3	2	4	[illegible]	[illegible]
	D	3	5	4	8	5		1				1	1	3	2	4	[illegible]	[illegible]
Plague-infected rats			3					3	11	6	17		3	2		1	[illegible]	
Ratnapura	C					1												
Tellijjawila	C					1												
China (see also table below):																		
Fukiang Province—Chuanchow.[6]																		
Manchuria.[7]																		
Dutch East Indies: West Java	C	548	591	670	868	237	206											
	D	546	588	668	866	237	205	164										
Ecuador (see also table below):																		
Duran	C							1										
Guayaquil	C			3	8	6	14	6	9	7	9	5	17	10	13	2	5	
	D				3	2	3	6	4	1	2	3	5	5	1		3	1
Plague-infected rats						4	1	1	2	1	2		4	5			4	1
Loja Province—Celica	C		1															
Nabon	C								1									
Egypt:																		
Alexandria	C																	
Plague-infected rats		P	P	P	P		P		P		P							
Asyut	C	3	2	1								1				1	2	
Girga	C	1																
Minya	C	3																
Qena	C	1					1											
Great Britain—England—Liverpool.[8]																		
Hawaii Territory. Plague-infected rats:																		
Hawaii Island—Hamakua district		1																
Hamakua Mill														1				1
Kalopa			3	1														
Kukaiau							1			2					1			
Paauhau[9]					1			1	1									
Paauilo			1															
Maui Island—Makawao district—Kahului (9–10 miles from)				2	1													

[1] Including plague in the United States and its possessions.

[2] A report dated Aug. 8, 1935, states that 4 cases of plague occurred at Leventue, Pampa Territory, Argentina, during 2 months.

[3] A report dated Aug. 2, 1935, stated that plague-infected rats were present at San Luis, Argentina.

[4] Reports of plague in Brazil have been received under the dates indicated, as follows: July 25, 1935, 4 cases at Vicosa, Alagoas State; July 2, about 16 deaths in Fiera Santana, Bahia State since Jan. 1; Oct. 15, 7 cases near Bomfim, Bahia State, during September; during October 1935, 3 cases at Tanguinho, Santa Barbara, Bahia State; [illegible] 10 cases in Ceara State since Jan. 1; Sept. 10, 204 cases with 72 deaths in Pernambuco State up to Aug. 24; Oct. 8, 4 cases and 1 death at Paulista, Piauhy State; Nov. 1–30, 7 cases near Feira, Bahia State; Dec. 1–31, 20 cases near January Catuny, Bahia State.

[6] A report dated July 4, 1935, states that 76 cases of plague with 58 deaths were reported at Chuanchow, Province of Fukiang, China. Plague was also present at Lungyen.

[7] A report dated Oct. 28, 1935, states that up to Oct. 23, 155 deaths from plague were reported in the provinces of Kirin, Lungkiang, Fengtien, and South Hsingan, Manchuria, China. A report dated Nov. 27, 1935 stated that 28 deaths from plague had occurred in the vicinity of Koshan, and that there were about 15 cases in Harbin.

[8] During the week ended Dec. 7, 1935, 2 plague-infected rats were reported at Liverpool, England, in the docks zone near cereal-laden ships from South America and the Orient.

[9] 1 plague-infected rat was reported in Paauhau Sector, Hamakua district, on Dec. 31, 1935.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 26-June 29, 1935	June 30-July 27, 1935	July 28-Aug. 31, 1935	Sept. 1-28	Week ended— October 1935: 5	12	19	26	November 1935: 2	9	16	23	30	December 1935: 7	14	21	28
India	C	261	176	947	1,433	454	828	754	599	451	655	653	649					
	D	183	111	483	633	210	373	329	316	181	184	201	204					
Bassein	C	4	4	1	3				1							1		
Plague-infected rats		1	3	1										1				
Bombay Presidency	C	14	68	162	163	116	112	89	46	33	71		30	14	34			
	D	8	36	79	94	60	82	64	28	22	46		20	5	12			
Central Provinces and Berar	C		6	255	483	131	25	308		229	351	323	366	382	208	272	119	117
Madras Presidency	C	5	9	49	111	33	31	37	20	19	25	27	37					
	D	2	2	21	46	15	16	27	15	19	16	14	22					
Punjab	C	40									11	9	12	16				
	D	31									5	3	3	10				
Rangoon	C	2	8	6	1				1						[8] 1			
Plague infected rats			2	1	1				1						1			
Indochina (see also table below):																		
Longxuyen	C	1																
Saigon and Cholon	C	2		2														
Tayninh	C	1																
Iraq:																		
Baghdad	C	1	2	3	1							1				1		
Libya: Province of Tripoli—Tagiura	C		1															
Madagascar. (See table below.)																		
Morocco:																		
Draa boundaries—Tighmert	C		7															
Mogador	C		9															
	D		3															
Peru. (See table below.)																		
Senegal. (See table below.)																		
South-West Africa. (See table below.)																		
Tunisia: Tunis	C	1	2	2	10	2							1					
	D	1	1		2								1					
Plague-infected rats		2		1									1					
Union of South Africa	C		7	4	8		[10] 4		[10] 14		[10] 2		[10] 5		[10] 2		[10] 5	
Cape Province	C														1			
Orange Free State	C													1	1			

United States:																		
California—Plague-infected ground squirrels:																		
Lassen County		2	1															
Modoc County		65																
San Luis Obispo County																		
Montana—Dillon—Plague-infected ground squirrels			1															
Oregon—Plague-infected ground squirrels.																		
Grant County			7															
Lake County		1																
Wallowa County			[11] 6															
On vessel: S. S. *Ipanema* at Marseille	C							[12] 2										

[5] Imported. [10] For 2 weeks. [11] Includes 1 suspected plague-infected squirrel.

[12] One of these cases was a member of the crew and the other was a stevedore believed to have worked on the vessel. Several plague-infected rats were reported found on board the vessel.

Place		June 1935	July 1935	August 1935	September 1935	October 1935	November 1935
Argentina (see also table above):[13]							
Jujuy Province	C		1				
Pampa Territory—Victorica	C	2					
Santiago de Estero Province—Frias	C	2					
Azores	C	1		3	4	2	
Belgian Congo	C		3				
Bolivia	C			[14] 4			
China: Kwangchowan	C						
	D						
Ecuador: Loja Province	C						
Indochina (see also table above):							
Cambodia	C				1		
Cochinchina	C	9		1			
Madagascar (central region)	C	95	112	138	232	293	
	D	92	102	133	227	282	

Place		June 1935	July 1935	August 1935	September 1935	October 1935	November 1935
Peru	C	4	4	10	3	1	14
Catamarca Department	C						3
Lambayeque Department	C						
Libertad Department	C		2		1	1	1
Lima Department	C	4	2	5	2		16
Callao	C	1		3			
	D	1		2			
Plague-infected rats							
Lima	C	1	1	5			
	D	1		2			
Senegal:							
Baol [15]	C			16	8		
Dakar [15]	C	19	25	2			
	D	13	15	1			
Louga [15]	C						
Rufisque [15]	C	8	2	4			
Thies [15]	C	20	17	22			
Tivaouane [15]	C	48	42	46	11	1	1
South-West Africa. Ovamboland [17]	C		[16] 24				

[13] During December 1935, 5 cases of plague, with 3 deaths, were reported in Rafael Garcia, Cordoba Province, Argentina.
[14] Suspected.
[15] Incomplete reports.
[16] For 2 months.
[17] From the beginning of 1935 up to Sept. 30, 135 cases of plague were reported in Ovamboland, South-West Africa.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		May 26–June 29, 1935	June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28	Week ended— October 1935 5	Oct. 12	Oct. 19	Oct. 26	November 1935 2	Nov. 9	Nov. 16	Nov. 23	Nov. 30	December 1935 7	Dec. 14	Dec. 21	Dec. 28
Algeria:																		
Algiers Department	C	1	1		5													
Constantine Department	C	2																
Argentina.[1]																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil.																		
Porto Alegre (alastrim)	C	46	29	6														
Rio de Janeiro	C	1																
Santos	C				2													
British East Africa:																		
Kenya	C	2	2	7														
Tanganyika	C	98	96	50	36		1	5		9		8		1				
British Guiana	C	40																
British Somaliland	C	25	16	3	25	1		1	2	1	1	1			2	1		
British South Africa:																		
Northern Rhodesia	C	2			1													
Southern Rhodesia	C							1										
Canada:																		
Alberta	C			[2] 1										[2] 1				
British Columbia	C			[2] 1	5	[2] 1				[2] 1						1	1	1
Manitoba	C		[2] 1															
Ontario	C	1	3															
Quebec	C		[2] 2															
Saskatchewan	C	1				[2] 3						[2] 1						
Canary Islands: Santa Cruz de Tenerife	C			1														
Chile: Chuquicamata	C		[2] 1	1														
China:																		
Amoy	C	4	2	1														
Dairen	C	29	8	2														
Foochow	C	P	P	P	P	P		P		P		P		P		P		
Hangchow	C	3	1															
Hankow	C	4																
Hong Kong	C	1										1	1					

Nanking	C	1	3							3		9	6	8	10			
Shanghai	C	12	2	5	1	1		1		1		1		2	1	3		3
Swatow	C	3			1					1		2			1			
Tientsin	C	7		1														
Tsingtao	C	3		1														
Chosen. (See table below.)																		
Colombia	C	44		3	111						[4] 26	1		18		14	15	
Bogota	C			10							[4] 1			7	3			
Dahomey. (See table below.)																		
Ecuador. (See table below.)																		
Egypt:																		
Dakahliya	C	2																
Gharbiya	C	1																
Provinces	C	1																
Eritrea	C			5	14	5		2										
Asmara	C							1	3									
France. (See table below.)																		
Great Britain. England and Wales	C	1																
Greece: Salonika	C	64		8	6							2	2					
Guatemala. (See table below.)																		
Honduras: Tela	C	4	P				2											
India	C	30,153	13,440	10,576	5,530	1,170	1,076	906	903	1,207	1,337	1,731	1,970					
	D	7,225	3,320	2,735	1,256	251	209	195	210	225	265	346	418					
Assam	C	28	6	100	19		2	1	7	2		2	3	10	42	26	47	82
Bombay Presidency	C	5,046	2,273	1,678	748	148	80	155	104	117	178		152	188	183			
	D	957	471	363	133	23	10	19	13	9	18		32	31	32			
Bombay	C	239	402	54	24	4	3	1	3	2	6	2	5	6	8	6	6	10
	D	150	60	33	15	1	2	1		1	3	2	1	5	7	2	5	7
Calcutta	C	128	56	53	24	3	2	4	4	2	2	4	2	9	7	13	27	41
	D	109	40	27	15	2	1	1	1	2	2	2	1	5	3	9	14	30
Central Provinces and Berar	C	2,345	651	340	114	35	337	8		36	51	54	167	167	185	273	214	190
Cochin	C						1	3	1	1								
Karachi	C	26	7	7	1		1		1		1	1	1			1	9	[3] 1
Madras Presidency	C	3,190	2,615	3,465	2,246	506	461	355	342	394	358	325	371			111	96	72
	D	624	402	573	401	97	89	85	68	66	62	61	60			14	7	22
Madras	C	24	10	10	10		1			3		1		3	3		2	
Moulmein	C	5	6	18	5					1			1		2			4
Negapatam	C	8	6	17	3			2										
Northwest Frontier Province	C		9	6	2							9			2	3	1	1
Punjab	C	430	168	72	79	30	16	18	35	40	41	46	107	102	73	96	82	68
Rangoon	C	25	16	8	2			1			[3] 1				[3] 1	[3] 1	2	
Tuticorin	C	11	19	25	12	2	4	1	4	3							5	
Vizagapatam	C	40	14	14	14	1	9	4	4	1		1	2	2		1	5	5

[1] A report dated Oct. 25, 1935, states that 19 cases of smallpox have been reported in Entre Rios Province, Argentina.
[2] For 2 weeks.
[3] Imported.
[4] For 6 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 26–June 29, 1935	June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28	Week ended— October 1935: 5	12	19	26	November 1935: 2	9	16	23	30	December 1935: 7	14	21	28
India (French):																		
Chandernagor	C	5	8	4	5			2	2					44				
Karikal	C	89	21	44	12	13	6	3	3					1				
Pondichery	C	61	50	51	22	2	6	8						3				
	D	48	41	89	24	2	8	8						8				
Indochina (see also table below): Haiphong	C	8	2	1														
Iran	C	7		2	8	4	8	8	4		1	2			8			
Teheran	C	8	1		2	1		2										
	D	1			1			1										
Iraq	C	8		9		8	7		1				7	1	9	17	4	
Arbil	C			1														
Baghdad	C	1								1			1					
Basra	C					1						1						
Italian Somaliland	C													2				
Japan (see also table below)	C																	
Kawasaki	C		1															
Kobe	C	1																
Mizuma Migifu Prefecture.[3]																		
Nagoya	C	5																
Lithuania	C		1															
Mexico (see also table below):																		
Chihuahua	C											[1] 1						
Guadalajara	D	5	2	1	2				1	1	3	2	2	1	8	1	4	8
Mazatlan	C													1				
Mexico, D. F.	C	135	32	51	19			2	1	2	5	3		2				
Monterey	C							1				1						
San Luis Potosi	D		2	2	4													
Torreon	C									1			8	1	1			
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	389	472	194	290	[illegible]	239		[2] 50		[2] 17		[2] 129					
Lagos	C	1																

Niger Territory. (See table below.)																		
Nyasaland. (See table below.)																		
Oman.[7]																		
Peru. (See table below.)																		
Poland	C		1	1										1				
Portugal (see also table below):																		
Lisbon	C	1	1	2	2		1	1	1	1		2	2		5		1	2
Oporto	C	1	2															
Salvador. (See table below.)																		
Saudi Arabia	C	14	7	1						2								
Siam: Bangkok	C		6															
Sierra Leone	C	31	47	344	288		[3] 41		[3] 60		[3] 176		[3] 46					
Freetown	C		6	3	2		[3] 7											
Spain	C	45	38	13	12			5	2	1								
Straits Settlements. Singapore	C	7	16	12	1													
Sudan (Anglo-Egyptian)	C	2	2	7									2					
Syria: Tripoli	C						1											
Turkey. (See table below.)																		
Union of Soviet Socialist Republics. (See table below.)																		

[3] For 2 weeks.
[5] A report dated June 11, 1935, stated that 10 deaths from smallpox had occurred in Mizuma Migifu Prefecture, Japan.
[6] For 3 weeks.
[7] During the week ended Jan. 4, 1936, 750 cases of smallpox were reported in Sharjah and Pirate Coast, Oman.

On vessels:
- S. S. *Keros* at Singapore from Calcutta — 1 case — May 29, 1935
- S. S. *Anshun* at Singapore from Hong Kong — 1 case — June 1, 1935
- S. S. *Cremer* at Singapore from Amoy — 1 case — June 4, 1935
- S. S. *Van Heutz* at Singapore from Amoy — 1 case — June 18, 1935
- S. S. *Chitose Maru* at Nagasaki from Dairen — 2 cases — July 2, 1935
- S. S. *Perala* at Aden from Massawa — 1 case — July 13, 1935

On vessels—Continued.
- S. S. *Englistan* at Rangoon from Gopalpore — 1 case — July 20, 1935
- S. S. *Hong Kheng* at Singapore from Amoy — 2 cases — Aug. 1, 1935
- S. S. *Barenfels* at Gibraltar — 1 case — Aug. 22, 1935
- S. S. *Talamba* at Rangoon from Madras — 1 case — Sept. 9, 1935
- S. S. *Ethiopia* at Rangoon from Madras — 1 case — Oct. 4, 1935

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1935	July 1935	August 1935	September 1935	October 1935	November 1935
Belgian Congo	C	108	197	261	303	248	
Bolivia	C	44	47	30	57	23	
China: Manchuria—Harbin	C					1	
Chosen	C	102	47	32	16		
Dahomey	C		7	2	3		
Ecuador	C	14					
Quito	C	8					
Finland	C	1					
France	C	57	60	1	6	16	
Guatemala	C				4		1
Indochina (see also table above)	C	210	203	138	103	98	66
	D	57	31	30	16	12	10
Japan (see also table above)	C	26					
Mexico (see also table above):							
Aguascalientes State:							
Aguascalientes	C	3	3				
Campeche State	C	2	1				
Chihuahua State	C	4					
Chihuahua	C	3					
Guanajuato State	C		4	2			
Leon	C	13	2	2			
Hidalgo State	C	1					
Jalisco State	C	10	10	1			
Guadalajara	C	5	2	1			
Lower California	C		3				
Mexico (see also table above)—Con.							
Mexico State	C	1	1				
Mexico, D. F.	C	140	54	35			
Mexico City	C	118	41	31	2		
Morelos State	C	1					
Nuevo Leon State	C	7					
Oaxaca State	C	2		23			
Puebla State:							
Puebla	C	6	2	1			
Queretaro State	C	5					
San Luis Potosi State	C		5	5			
San Luis Potosi	C	5	3	5			
Vera Cruz State	C			3			
Vera Cruz	C			1			
Morocco	C	12	5		1		
Mozambique	C			2	37	15	
Niger Territory	C		174	209	111	127	
Nyasaland	C	37	35	11	14	24	
Peru	C	3	10	154	141		
Portugal (see also table above)	C	76	38		52	154	
	D	5	2		9	34	
Salvador	C		35	2			36
Turkey	C	30	9			1	
Union of Soviet Socialist Republics	C	125					

TYPHUS FEVER

Place		May 26–June 29, 1935	June 30–July 27, 1935	July 28–Aug. 31, 1935	Week ended— Sept. 7, 1935	Sept. 14	Sept. 21	Sept. 28	Oct. 5, 1935	Oct. 12	Oct. 19	Oct. 26	Nov. 2, 1935	Nov. 9	Nov. 16	Nov. 23	Nov. 30	Dec. 7, 1935	Dec. 14	Dec. 21
Algeria:																				
Algiers Department	C	43	18	1				1			1			1						
Algiers	C	2																		
Constantine Department	C	97	36	8		1	2	1	1	3	1			1						
Bone	C					1	1													
Constantine	C						1			1										
Philippeville	C	5	2																	
Oran Department	C	4	17																	
Australia:																				
Queensland	C		2	1																
Sydney	C															1	1			
Basutoland	C		11																	
Belgian Congo	C									1										
Bolivia. (See table below.)																				
Bulgaria	C							1												
Chile	C	363	282	397	55			[1] 230				[1] 473			[3] 400					
Conception	C	[2] 18	16	52	[1] 18			[1] 14				[2] 21								
Santiago[4]	C	[2] 82	111	245	31			[1] 141												
Valparaiso	C		1	8	2	7	2	13	8		10	13	25	2	17		12	6	15	10
China:																				
Canton	C																			
Hangchow	C	2													2					
Hankow	C		2	1				1	1	1	1				1					
Harbin[5]	C	2																		
Hong Kong	C						1													
Nanking	C	1											1							
Shanghai	C	2	2	1																
South Manchuria Railway Zone	C				2															
Tientsin	C	5												1						
Tsingtao	C	1	1	6	1		2	4												
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				

[1] For 3 weeks.
[2] For 2 weeks.
[3] For 4 weeks.
[4] A report dated Jan. 20, 1936, states that there were 305 cases of typhus fever, with 58 deaths, in Santiago Province, Chile, from Nov. 2–16, 1935.
[5] A report dated June 25, 1935, states that about 400 cases of typhus fever occurred at Harbin, Manchuria, China.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		May 26–June 29, 1935	June 30–July 27, 1935	July 28–Aug. 31, 1935	Week ended— September 1935: 7	14	21	28	October 1935: 5	12	19	26	November 1935: 2	9	16	23	30	December 1935: 7	14	21
Egypt:																				
Alexandria	C	12	4															1		
Aswan	C	2																		
Assyut	C		3	4								1			1					
Behera	C	50	19	9		1	1		7	2		1			5	6		8		4
Beni-Suef	C	2	1	1																
Cairo	C	1	1	1				1												
Dakahliya	C	2	2	1																
Damietta	C					1														
Faiyum	C	1													1					
Gharbiya	C	119	36	16		2									1					
Girga	C			1												1				
Minufiya	C	27	20	1		1														
Minya	C	4	2	3																
Port Said	C		2	2	1															
Qena	C	1													1					
Sharkiya	C	9	4	1																
Suez	C															1				
Provinces	C	225	98	41	8	4	4	2	7	3	1	3	1	1	10	8	6	13	9	
France. (See table below.)																				
Greece: Salonika (see also table below)	C																1	1		
Guatemala. (See table below.)																				
Hawaii Territory—Honolulu	C		1	1						2		4					1	1		
Hungary	C	5																		
Iran	C	96	29	29	9	6	3	3		2	2	1		2		3	2		1	
Teheran	C	22	14	1	1	1	1				2				1					
Iraq	C																		17	
Baghdad	C			1																
Basra liwa	C						1													
Sulaimani liwa	C	9																		

Irish Free State.																				
Waterford County:																				
Lismore	C	1																		
Youghal District No. 2	C															1				
Japan: Tokyo	C	13	1																	
Latvia. (See table below.)																				
Lithuania	C	21	12	6		1	2								1		[2] 18			
Mexico (see also table below):																				
Guadalajara	D	1	1																	
Mexico, D. F.	C		94	142	36	42	26	30		30	20		23	15	8	7	7			
Torreon	D					1		1												
Morocco (see also table below)	C	86	62	19		1		2			1		7				1	1	8	
Palestine:																				
Haifa	C	3	3	[6] 7		6	3	[7] 2	1	3	1	3	4	4	1	1	1			
Panama Canal Zone. (See table below.)																				
Paraguay: Asuncion	D		1																	
Peru. (See table below.)																				
Poland	C	445	175	130	14	19	9	14	29	30	28	22	23	23	24	34	55	59	68	73
	D	21	10	10	1	1			3		1	1	2		2	2	2	5	6	6
Portugal. (See table below.)																				
Rumania. (See table below.)																				
Straits Settlements. Singapore	C			2			1			1				1						
Trans-Jordan	C	13		1	2				1	1										
Tunisia:																				
Tunis	C	3	1	1	3		1		1			1	1					1		
Provinces	C	115	88	56	12	4	3		1		1	11	2	1	1		2	4		20
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Union of Soviet Socialist Republics. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: S. S. *Agamemnon* at London	C							1												

[2] For 2 weeks.
[6] Includes 3 imported cases.
[7] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1935	July 1935	August 1935	September 1935	October 1935	November 1935
Bolivia	C	111	114	180	140	88	
China: Manchuria—Harbin	C	25				1	3
Chosen	C	135	40	31	17		
Czechoslovakia	C	11	33	3	1	12	
France	C			1			
Greece	C		5	1	4	6	
Guatemala	C	6	22	24	43	18	26
Latvia	C		1				
Mexico (see also table above):							
Aguascalientes State:							
Aguascalientes	C	1					
Coahuila State	C			1			
Durango State	C		1				
Guanajuato State	C	3	9	7			
Leon	C	1	5	6			
Hidalgo State	C		6				
Jalisco State	C			8			
Guadalajara	C	3	1	1			
Mexico State	C		2	15			
Mexico, D. F.	C	95	178	180			
Mexico City	C	91	170	155	54	22	
Michoacan State	D	1					
Nayarit State	D			6			
Oaxaca State	C	1	5	6			

Place		June 1935	July 1935	August 1935	September 1935	October 1935	November 1935
Mexico—Continued.							
Puebla State	C		7				
Puebla	C	4	5	9			
Queretaro State	C	1		5			
San Luis Potosi State	D		11	3			
San Luis Potosi	C	5	1	1			
Sonora State	C			4			
Vera Cruz State	C	1		7			
Vera Cruz	C			2			
Morocco	C		65	12	3	8	
Panama Canal Zone	C	1	1			5	
Peru	C	19	16	3	41	16	
Portugal	C	3	4		3	2	
Rumania	C	309	89	36	26	87	
Turkey	C	54	42	34	19	12	13
Union of South Africa:							
Cape Province	C	172	79	97	55	48	
Natal	C	2	2	4			
Orange Free State	C	123	37	37	10	28	
Transvaal	C	25	3	6	2	2	
Union of Soviet Socialist Republics	C	4,643					
Yugoslavia	C	131	49	31	11	6	19

YELLOW FEVER

Place		May 26–June 29, 1935	June 30–July 27, 1935	July 28–Aug. 31, 1935	Week ended— September 1935				October 1935				November 1935					December 1935
					7	14	21	28	5	12	19	26	2	9	16	23	30	7
Bolivia: Santa Cruz Department—Chuchio: [1]																		
Brazil: [2]																		
Goyaz State	C	6																
Maranhao State	C	1																
Mato Grosso State	C	2	9															
Minas Geraes State	C	14	6	9														
	D	8																
Pára State	C	1								1								
Sao Paulo State	C	1		1														
Colombia:																		
Intendencia of Meta	C			1														
Acacias	C			1										2				
Restrepo	C		1											2				
Dahomey:																		
Parakou	C	[3] 1																
Porto Novo	C		1															
Gold Coast:																		
Bawku	C									3								
Cape Coast	C			1														
Tamale	C						1											
Ivory Coast:																		
Abidjan [4]	C															1		
Indenie Circle. [5]																		
Sassandra	C													1				
Senegal: Dakar. [6]																		
Sudan (French): Koutiala	C											1				1		

[1] During the month of June 1935, 1 case of yellow fever was reported at Chuchio, Bolivia.

[2] During December 1935 yellow fever has been reported in Brazil as follows Bahia State, Esplanada, 1 case, 1 death, Dec. 22–28; Matto Grosso State, Campo Grande, 1 case, 1 death, Dec. 25; Minas Geraes State Altinopolis, 1 fatal case, Dec, 26, Passos, 2 fatal cases, Dec. 15–21, 1 fatal case, Dec 26, Sao Paulo State: Mattao, 2 fatal cases, Dec. 20, 1 fatal case, Dec. 25; Monte Aprazivel, 1 fatal case, Dec. 25; Pennapolis, 1 fatal case, Dec. 29.

[3] Suspected.

[4] During the week ended Dec. 21, 1935, 1 case of yellow fever was reported at Abidjan, Ivory Coast.

[5] 1 fatal case of yellow fever was reported in Indenie Circle, Ivory Coast, at the end of December 1935.

[6] Under date of Dec. 17, 1935, 1 suspected case of yellow fever was reported in Dakar, Senegal.

X

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UNITED STATES PUBLIC HEALTH SERVICE

W. F. DRAPER, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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CALCIUM CYANIDE DUST IN SHIP FUMIGATION

By C. L. Williams, *Senior Surgeon, United States Public Health Service*

Among the procedures introduced of late years as improvements in ship fumigation, one of the most important has been the direct injection of fumigating gases into rat harborages as a preliminary step to general gassing of the whole ship. By this procedure the fumigant is directly introduced into the spaces where the rats seek protection instead of depending on slow, haphazard, and unreliable penetration and diffusion.

It would appear that an improvement of this type would be generally taken up at once, but such has not been the case. As a matter of fact, it can hardly be said to have been taken up at all, the use of such procedure in the United States at the present time being restricted to two or three quarantine stations.

The reason for this is really not far to seek. Quarantine officers in general appear not to be prone to adopt readily procedures that represent additional work and hazard; obviously, direct injection of rat harborages is of this type. However, all quarantine officers cannot be held at fault; at some stations the apparatus and specially trained personnel required cannot be reasonably maintained, and it must be admitted that in utilizing liquid HCN as an injection material the method is somewhat laborious and adds distinct hazards.

Attempting to view human nature as it is and not as he would like it to be, the writer has endeavored during the past 2 years to develop simplified and safer methods of directly injecting hydrocyanic acid gas into rat harborages, with the hope that thereby a procedure might be developed so simple and relatively safe that its adoption at all major quarantine stations could reasonably be insisted upon. The use of calcium cyanide dust is offered as such a method.

METHOD OF PROCEDURE

As a matter of fact, direct injection of rat harborages with calcium cyanide dust is simplicity itself. The dust is taken from a tightly covered can, in which it is marketed, by dipping it up with a large spoon or small cup. It is poured into the container of a foot-pump type of duster, this container then being screwed in place. The rubber hose extending from the duster (fitted with a nozzle if desired) is

inserted into small openings into harborages by a fumigator while another operates the pump, usually 2 to 4 strokes in each harborage being sufficient. If the enclosed spaces to be treated are few or of limited extent, the whole operation might be carried on, even in the hold of a ship, without the wearing of gas masks by the fumigators. If, however, many harborages are to be treated or they are extensive, gas-mask protection is necessary.

CALCIUM CYANIDE

The material used, calcium cyanide (the formula of which is $Ca(CN)_2$), is manufactured in this country in the process of manufacturing cyanamide for use as a fertilizer. So far as the writer is aware, it is at present manufactured in the United States only by the American Cyanamid & Chemical Corporation, under the trade name Cyanogas. It is also manufactured in Germany, the German product being sold in this country under the trade name Calcyanide.

Cyanogas is obtainable in flakes, granules, or as a dust, the latter being quite fine, most of the particles passing a 200-mesh screen. Calcyanide is at present obtainable only as a fine dust, although it is available abroad in the form of briquets, which are usually broken into a dust for use. Cyanogas is blue in color, while Calcyanide is a light brown. Cyanogas contains from 40 to 50 percent calcium cyanide, while Calcyanide contains from 80 to 85 percent calcium cyanide. This is an important point to remember, since in interchanging these materials the Calcyanide must be used in approximately half the amounts of Cyanogas. For use in the foot-pump duster, the form of Cyanogas to be specified is the "A" dust.

The action of calcium cyanide is based upon the fact that it takes up moisture from the air to form hydrocyanic acid and calcium hydroxide; the former is liberated as a gas. The thinner the layer exposed to the air, the more rapid is the reaction. When a duster is used, the dust is blown out as a cloud and the reaction with the moisture of the air is almost immediate, continuing up to the point where the moisture present is exhausted. This limiting point is not reached when calcium cyanide is used, as described herein, for ship fumigation. The amount of HCN produced is approximately one-half the weight of the calcium cyanide entering into the reaction. Therefore, when Cyanogas is used, the HCN produced will be between one-fifth and one-fourth of the weight of the raw material. When Calcyanide is used, it will be approximately two-fifths of the weight of the raw material.

The reaction between water and calcium cyanide is reversible, that is, the calcium hydroxide in the presence of hydrocyanic acid takes up this material to produce calcium cyanide and water. This is of some importance where large amounts of calcium cyanide are used and it is spread in relatively thick layers. Where the material is dusted

widely in relatively small amounts, however, the amount of HCN that will be retained in the residue is not likely to be dangerous.

FOOT-PUMP DUSTER

The foot-pump duster that has been used in experiments with Cyanogas and Calcyanide is one supplied commercially by the American Cyanamid & Chemical Corporation and is built for the purpose of dusting their Cyanogas "A" dust. This duster operates equally well, however, with Calcyanide. The device consists of an air pump attached to a stirrup at the bottom; one foot is placed in the stirrup to hold the apparatus steady while pumping. The stirrup is tall enough to accommodate a one pint glass mason jar or a similar jar made of aluminum, which is preferable. The jar screws into a fitting on the bottom of the pump. Air from the pump passes into the jar through a check valve and out of the jar through a delivery hose. On the down stroke, about one fifth cubic foot of air is blown at high velocity through a small opening into the container, where it stirs up the dust and carries a portion of it out through the delivery tube. Approximately 1/12 ounce of the dust is delivered at each stroke.[1]

DOSAGE

The vast majority of rat harborages are either of small capacity or are subdivided into small spaces. When subdivided, of course, each subdivision must be separately injected. As a rule, a harborage or a subdivision will not be of more than 10 cubic feet capacity, and often is of not more than 2 or 3 cubic feet capacity. Since the foot-pump duster delivers about 1/12 ounce of the dust per stroke, the Cyanogas "A" dust delivered by a single stroke will, in a pipe casing of, say, 4 cubic feet capacity, produce a theoretical HCN concentration of about 3½ ounces per 1,000 cubic feet. If Calcyanide is used, the concentration will be about 7½ ounces per 1,000 cubic feet. Two strokes, of course, will produce approximately twice these concentrations in such a space.

In experimental work with pipe casings, it was found by titration of the HCN present that the theoretical figures cited were not actually attained, probably because of absorption of gas and leakage. Furthermore, in considering this problem one must bear in mind that, in practice, leakage will be considerable and that the concentration will rapidly fall unless the harborage injected is of very tight construction.

In actual practice on ships, a number of different dosages were utilized; but it was found that, for the majority of harborages not in excess of 10 cubic feet capacity, four strokes of the pump when

[1] Recently this duster has been improved by attaching a by-pass valve, permitting air alone to be pumped through the hose, so that a charge of dust may thereby be widely distributed. A duster with a 2-quart dust jar is obtainable.

Cyanogas was used, or two strokes of the pump when Calcyanide was used, gave excellent results in rat destruction.

SAFETY

In distributing calcium cyanide dust with a foot-pump duster as described, the hazard to the operators is low. This is due principally to the fact that while high concentrations of HCN are produced in the constricted harborages, the actual amounts of dust liberated are so small that concentrations in the open ship's hold remain quite low. So far as the apparatus is concerned, the only hazard of any material importance is the possibility that the dust container may become loosened and drop off just as the pump is operated. This would cause a blast of dust to fly up in the face of the operator. Danger from such an accident can be entirely obviated if the operator wears a gas mask. In actual practice during experiments to test this material, no such accident has occurred, and no fatalities from such accidents are reported in the literature despite the fact that this type of dust pump is extensively used in destroying burrowing rodents on farms throughout the United States.

Because the absolute amounts of dust injected into harborages are small, the dangers from gas being held in these harborages and later escaping into the ships' holds after they have been cleared is practically nil. This is apparent when one considers that the harborage is of only a few cubic feet capacity while the hold is from 30,000 to 100,000 cubic feet in capacity. An amount that may produce a high concentration inside a 4 cubic foot pipe casing becomes hardly more than a smell when liberated into the open hold.

FUMIGATING HOLDS

Calcium cyanide dust may also be readily utilized to fumigate ships' holds by blowing it into them with compressed air or some type of centrifugal blower. A vacuum cleaner with the bag replaced by a delivery hose does very well; it can be utilized also in the superstructure, but there presents the disadvantage that the fine dust, universally distributed, presents a subsequent cleaning problem.

The Calcyanide Co. also offers an apparatus wherein the HCN is extracted by air in a large bag and the gas-laden air, free from dust, is delivered through a hose, which obviates the cleaning problem.

MILK-SANITATION STATUS OF URBAN COMMUNITIES

Urban Communities in Which Pasteurized Milk is Both Properly Produced and Properly Pasteurized and in Which Raw Milk is at Least Properly Produced, as Shown by Ratings of 90 Percent or More Reported by the State Milk-Sanitation Authorities During the Period January 1, 1934, to December 31, 1935

The accompanying list gives the fifth semiannual revision of the list of urban communities in which pasteurized milk is both properly produced and properly pasteurized and in which raw milk sold to the final consumer is at least properly produced, as shown by ratings of 90 percent or more reported by the State milk-sanitation authorities.

The primary reason for publishing such lists from time to time is to encourage the communities of the United States to attain and maintain a high level of excellence in the public health control of milk supplies. Another reason is to furnish the local residents and the traveling public with some means of knowing whether the communities in which they live or through which they travel have available a grade of pasteurized milk which is both properly produced and properly pasteurized, or, in the absence thereof, have raw milk which is at least as safe as raw milk can practicably be made and is fit for private pasteurization.

It is emphasized, however, that the Public Health Service does not intend to imply that all communities not on the list are not provided with high-grade milk supplies. Some communities which have high-grade milk supplies are not included because arrangements have not been made for the determination of their ratings by the State milk-sanitation authority. In other cases, the ratings which have been determined are now more than 2 years old and have therefore lapsed.

The rules under which a community is included in this list are as follows:

(1) All ratings must have been determined by the State milk-sanitation authority in accordance with the Public Health Service rating method, based upon the Public Health Service Milk Ordinance and Code.

(2) No community will be included in the list unless both its pasteurized milk and its raw milk ratings are 90 percent or more; provided that communities in which only raw milk is sold will be included if the raw milk ratings are 90 percent or more.

(3) The rating used will be the latest rating submitted to the Public Health Service, but no rating will be used which is more than 2 years old.

(4) Additional supplementary lists will be published quarterly, and complete revisions of the entire list semiannually.

(5) Occasional surprise checks will be made of the rating methods used by the State, and discounts will be applied if State ratings are found to be more than 5 percent too high.

Communities are urgently advised to bring their ordinances up to date at least every 5 years, since ratings will be made on the basis of later editions if those adopted locally are more than 5 years old.

Communities which are now on the list should not permit their ratings to lapse, as ratings more than 2 years old cannot be used.

Communities which are not now on the list should request the State milk-sanitation authority to determine their ratings and, if necessary, improve their milk-sanitation status sufficiently to merit inclusion in the list.

Communities which have not yet adopted the Public Health Service Milk Ordinance should give thoughtful consideration to the advisability of doing so. It is obviously easier to satisfy the requirements upon which the rating method is based if these are included in the local legislation.

Communities which are enforcing the Public Health Service Milk Ordinance, but which have nevertheless failed to be included in this list, should determine whether their low ratings result from failure to enforce the ordinance strictly or from failure to bring the ordinance up to date.

State milk-sanitation authorities which are not now equipped to determine municipal milk-sanitation ratings are urged, in fairness to their communities, to equip themselves as soon as possible. The personnel required is small, as in most States one milk specialist is sufficient for the work

The inclusion of a community in this list means that the pasteurized milk sold in the community, if any, is of such a degree of excellence that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A Pasteurized Milk is 90 percent or more, and that, similarly, the raw milk sold in the community, if any, is of such a degree of excellence that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A Raw Milk is 90 percent or more. However, high grade pasteurized milk is safer than high grade raw milk, because of the added protection of pasteurization. To secure this added protection, friendly customers of high grade raw milk dairies need not discontinue their patronage, but may pasteurize the milk at home in the following simple manner: Place the milk in an aluminum vessel on a hot flame and heat to 155° F., stirring constantly; then immediately set the vessel in cold water and continue stirring until cool.

TABLE 1.—*Communities in which all market milk is pasteurized. In these communities all market milk is both properly produced and properly pasteurized, as shown by pasteurized milk ratings of 90 percent or more*

Community	Percentage of milk pasteurized	Date of rating
MINNESOTA		
Winona	100	Sept. 14, 1934.
NORTH CAROLINA		
Princeville	100	Apr. 18, 1935.
Tarboro	100	Apr. 18, 1935.
SOUTH CAROLINA		
Charleston	100	April 1934.

TABLE 2.—*Communities in which some market milk is pasteurized. In these communities the pasteurized market milk is both properly produced and properly pasteurized and the raw market milk is at least properly produced, as shown by pasteurized and raw milk ratings, respectively, of 90 percent or more*

[NOTE.—All milk should be pasteurized or boiled before it is consumed, either commercially or at home See text for home method]

Community	Percentage of milk pasteurized	Date of rating
ALABAMA		
Tuscaloosa	77	Dec. 13, 1935
ARIZONA		
Flagstaff	32	Feb. 1935
Tucson	85	June 21, 1935
Yuma	39	June 14, 1935
ARKANSAS		
Little Rock	19	Dec. 15, 1935
KANSAS		
Lawrence	61	Mar. 1935
Topeka	51	Nov. 28, 1934
KENTUCKY		
Bowling Green	31	Dec. 5, 1934
Henderson	30	Apr. 1935
Louisville	97	May 1935
MINNESOTA		
Little Falls	55	Oct. 23, 1935
MISSISSIPPI		
Greenville	26	Aug. 29, 1935
Vicksburg	41	June 20, 1935
MISSOURI		
Columbia	39	June 7, 1935
Hannibal	35	Sept. 9, 1935
Jefferson City	49	Nov. 22, 1935
St. Joseph	81	Aug. 9, 1935
Sedalia	16	Sept. 26, 1935
Springfield	39	Aug. 24, 1935
NEW MEXICO		
Las Cruces	58	Nov. 13, 1935
NORTH CAROLINA		
Charlotte	19	Dec. 15, 1934
Durham	23	Dec. 14, 1934
Fayetteville	50	Mar. 28, 1935
Greensboro	62	Nov. 24, 1934
Kinston	17	Sept. 17, 1935
NORTH CAROLINA—contd.		
Morehead City	58	Dec. 14, 1935
Rocky Mount	20	Sept. 12, 1934
Winston-Salem	46	Nov. 11, 1934
OKLAHOMA		
Bartlesville	15	Mar. 6, 1934
Blackwell	46	Sept. 5, 1934
Tulsa	74	Feb. 16, 1934
OREGON		
Portland	76	Oct. 1934
TENNESSEE		
Bristol	48	May 8, 1935
Clarksville	42	Apr. 26, 1935
Memphis	80	May 29, 1935
Union City	32	Sept. 28, 1934
TEXAS		
Abilene	70	Aug. 7, 1935
Amarillo	61	June 29, 1935
Austin	35	Dec. 19, 1935
Big Spring	27	Aug. 5, 1935
Corsicana	4	Mar. 26, 1935
Dallas	73	Dec. 7, 1935
El Paso	71	July 31, 1935
Fort Worth	83	Feb. 23, 1935
Gainesville	46	Sept. 6, 1935
Houston	83	Oct. 1935
Laredo	39	Dec. 1935
Lubbock	32	July 10, 1935
San Antonio	64	Sept. 1935
Sherman	21	Dec. 21, 1934
Texarkana	20	May 1935
Tyler	51	Do.
Waco	31	Sept. 20, 1935
VIRGINIA		
Bristol	48	May 8, 1935
WASHINGTON		
Camas	10	Sept. 1934
Vancouver	24	Do.

TABLE 3.—*Communities in which no market milk is pasteurized, but in which the raw market milk is at least properly produced, as shown by raw milk ratings of 90 percent or more*

[NOTE.—All milk should be pasteurized or boiled before it is consumed, either commercially or at home See text for home method]

Community	Date of rating	Community	Date of rating
ALABAMA		NORTH CAROLINA	
Demopolis	Nov. 22, 1935	Angier	Sept. 4, 1934
Sylacauga	Dec. 6, 1935	Buies Creek	Do.
Talladega	Do.	Clinton	Oct. 25, 1934
York	Nov. 20, 1935	Coats	Sept. 4, 1934
		Dunn	Do.
KANSAS		Elkin	Sept. 12, 1934
		Erwin	Sept. 4, 1934
Horton	Dec 4, 1934	Hamlet	Aug. 28, 1934
Sabetha	Sept. 27, 1935	Hope Mills	Sept. 6, 1934
		Lillington	Sept. 4, 1934
KENTUCKY		Lumberton	Sept. 11, 1934
		Manteo	Oct. 23, 1934
Leitchfield	June 1935	Monroe	Oct. 24, 1934
Somerset	Do.	Mount Airy	Sept. 12, 1934
		New Bern	Dec. 12, 1935
MISSISSIPPI		Pinehurst	Dec. 15, 1934
		Rockingham	Aug. 29 1934
Brookhaven	May 17, 1935	Southern Pines	Aug. 31, 1934
Durant	May 13, 1935	Southport	Oct. 2, 1935
Lexington	Do	Statesville	Mar. 27, 1935
Ocean Springs	Sept 5, 1935	Sylva	Sept. 23, 1935
Pascagoula	Do.	Washington	Sept. 26, 1935
Picayune	June 5, 1935	Williamston	Dec. 12, 1934
Yazoo City	May 14, 1935	TENNESSEE	
MISSOURI		Dyersburg	Oct. 1934
		TEXAS	
Ash Grove	Aug. 16, 1935		
		Brenham	Apr. 20, 1934
NEW MEXICO		Colorado	July 19, 1935
		Jacksonville	May 1935
Clayton	June 20, 1935	Livingston	Oct. 1934
Deming	Mar. 26, 1935	Victoria	Feb. 1935

DEATHS DURING WEEK ENDED JANUARY 18, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan. 18, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,440	9,330
Deaths per 1,000 population, annual basis	13.2	13.0
Deaths under 1 year of age	569	628
Deaths under 1 year of age per 1,000 estimated live births	51	58
Deaths per 1,000 population, annual basis, first 3 weeks of year	13.7	13.5
Data from industrial insurance companies:		
Policies in force	67,939,756	67,102,924
Number of death claims	14,700	16,247
Death claims per 1,000 policies in force, annual rate	11.3	12.6
Death claims per 1,000 policies, first 3 weeks of year, annual rate	10.2	10.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for weeks ended January 25, 1936, and January 26, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 25, 1936, and Jan. 26, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan 25, 1936	Week ended Jan 26, 1935	Week ended Jan 25, 1936	Week ended Jan 26, 1935	Week ended Jan 25, 1936	Week ended Jan 26, 1935	Week ended Jan 25, 1936	Week ended Jan 26, 1935
New England States:								
Maine	1	2	40	7	195	191	0	0
New Hampshire	3	1			31	6	0	0
Vermont					121	1	0	0
Massachusetts	8	6			344	271	4	0
Rhode Island		4		3	120	31	0	0
Connecticut	2	3	18	42	87	419	3	0
Middle Atlantic States:								
New York	50	60	[1] 21	[1] 17	916	823	22	6
New Jersey	14	23	11	54	33	139	3	0
Pennsylvania	41	61			518	1,697	6	4
East North Central States:								
Ohio	27	66	7	205	60	428	9	15
Indiana	30	29	47	164	165	626	4	0
Illinois	48	45	22	125	47	1,925	12	5
Michigan	11	18	4	39	52	270	6	0
Wisconsin	1	3	53	140	74	765	5	2
West North Central States:								
Minnesota	4	5		2	104	1,207	2	0
Iowa	17	4	7	48	5	1,006	2	2
Missouri	31	59	214	423	21	441	2	7
North Dakota	8	7	16	11	4	67	0	2
South Dakota	9	3			14	59	0	1
Nebraska	9	8		6	56	232	0	1
Kansas	17	11	25	40	41	735	1	3
South Atlantic States:								
Delaware				6	113		0	0
Maryland [3]	7	5	15	339	137	64	9	1
District of Columbia	31	7	4	32	9	23	3	3
Virginia	44	16			34	582	2	5
West Virginia	20	34	61	233	4	872	1	1
North Carolina [3]	31	35	11	374	21	728	6	1
South Carolina	8	5	391	1,226	3	28	1	0
Georgia [4]	18	14	193	1,824			0	3
Florida [4]	5	6	1	52	3	25	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 25, 1936, and Jan. 26, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan 25, 1936	Week ended Jan. 26, 1935	Week ended Jan. 25, 1936	Week ended Jan. 26, 1935	Week ended Jan. 25, 1936	Week ended Jan. 26, 1935	Week ended Jan. 25, 1936	Week ended Jan. 26, 1935
East South Central States:								
Kentucky	15	14	33	156	5	621	8	4
Tennessee	24	21	122	805	25	96	9	9
Alabama [4]	23	21	302	1,196	19	162	2	2
Mississippi [2]	9	2					1	0
West South Central States:								
Arkansas	13	10	94	69	2	18	5	2
Louisiana	19	29	6	12	56	81	0	0
Oklahoma [5]	10	8	183	187		82	8	5
Texas [4]	64	75	347	697	53	154	23	2
Mountain States:								
Montana	6	6	57	787	54	56	0	0
Idaho	1		2	7	90	29	0	0
Wyoming					1	69	1	0
Colorado	9	8			8	695	1	0
New Mexico	3	5	3	72	4	61	0	4
Arizona	3	4	92	147		14	0	0
Utah [2]					2	10	0	0
Pacific States:								
Washington					103	94	1	2
Oregon	2	3	16	219	674	80	2	0
California	44	51	129	407	987	239	3	4
Total	735	797	2,547	9,673	5,505	15,782	167	96
First 4 weeks of year	3,001	3,385	9,901	34,410	18,801	54,707	668	308

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan 25, 1936	Week ended Jan. 26, 1935	Week ended Jan. 25, 1936	Week ended Jan. 26, 1935	Week ended Jan. 25, 1936	Week ended Jan. 26, 1935	Week ended Jan. 25, 1936	Week ended Jan. 26, 1935
New England States:								
Maine	0	0	23	2	0	0	0	0
New Hampshire	0	0	18	11	0	0	0	0
Vermont	0	0	11	29	0	0	0	0
Massachusetts	1	1	280	153	0	0	1	1
Rhode Island	0	0	18	13	0	0	1	0
Connecticut	0	0	63	46	0	0	0	2
Middle Atlantic States:								
New York	1	0	899	666	0	0	8	3
New Jersey	0	1	243	129	0	0	3	0
Pennsylvania	1	1	620	602	0	0	4	6
East North Central States:								
Ohio	0	3	307	642	3	1	0	1
Indiana	0	0	301	211	0	2	0	6
Illinois	0	0	584	812	17	3	11	8
Michigan	0	0	316	343	0	1	7	3
Wisconsin	0	1	598	640	33	12	2	2
West North Central States:								
Minnesota	0	2	353	88	15	0	6	1
Iowa	0	0	203	73	20	1	0	2
Missouri	1	0	210	77	3	2	4	0
North Dakota	0	0	79	36	7	0	0	0
South Dakota	0	0	71	44	9	4	0	0
Nebraska	0	0	163	57	28	38	6	2
Kansas	1	1	213	78	9	7	0	2
South Atlantic States:								
Delaware	0	0	14	22	0	0	1	0
Maryland [3]	0	0	94	100	0	0	2	1
District of Columbia	0	1	19	29	0	0	0	0
Virginia	0	1	54	53	0	1	7	5
West Virginia	0	0	36	134	2	1	4	2
North Carolina [3]	2	0	50	49	0	0	5	0
South Carolina	0	0	10	4	0	0	1	2
Georgia [4]	1	0	29	19	1	0	1	2
Florida [4]	0	0	13	10	0	0	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 25, 1936, and Jan. 26, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan 25, 1936	Week ended Jan 26, 1935	Week ended Jan 25, 1936	Week ended Jan 26, 1935	Week ended Jan 25, 1936	Week ended Jan 26, 1935	Week ended Jan 25, 1936	Week ended Jan. 26, 1935
East South Central States:								
Kentucky	0	0	67	51	0	0	4	1
Tennessee	0	0	43	41	0	0	2	1
Alabama [4]	3	2	13	16	0	3	3	2
Mississippi [2]	0	0	11	15	0	0	0	1
West South Central States:								
Arkansas	0	0	6	10	0	2	1	4
Louisiana	1	0	81	36	0	1	1	4
Oklahoma [5]	0	1	48	53	1	6	1	5
Texas [4]	0	1	110	110	1	2	5	14
Mountain States:								
Montana	0	0	189	28	10	2	1	1
Idaho	0	0	69	5	3	1	0	0
Wyoming	0	0	79	12	0	12	0	0
Colorado	0	0	174	210	4	2	1	1
New Mexico	0	0	41	23	0	0	2	3
Arizona	0	0	47	20	0	0	0	1
Utah [4]	0	0	91	72	0	0	1	0
Pacific States:								
Washington	0	1	74	59	15	49	0	1
Oregon	0	0	77	70	4	0	0	1
California	1	11	349	216	0	3	4	12
Total	13	28	7,411	6,249	185	156	101	98
First 4 weeks of year	79	118	28,658	24,269	804	751	434	629

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever Week ended Jan 25, 1936, North Carolina, 1
[4] Typhus fever, week ended Jan 25, 1936, 16 cases, as follows. Georgia, 9, Florida, 1, Alabama, 5, Texas, 1.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1935										
Puerto Rico	-------	94	118	1,414	23	2	0	-------	0	30
November 1935										
Missouri	17	442	405	43	111	-------	11	739	10	25
December 1935										
Alabama	6	102	486	109	37	9	4	50	1	12
Colorado	10	38	-------	-------	39	-------	1	627	50	3
Idaho	2	4	7	-------	120	-------	1	269	3	1
Illinois	34	305	140	14	109	2	8	2,114	24	25
Kansas	9	75	25	1	27	-------	3	618	45	13
Louisiana	5	95	65	196	94	22	3	67	1	36
Massachusetts	-------	54	-------	4	483	2	21	1,013	0	5
Minnesota	2	42	2	-------	224	-------	2	1,426	80	25
Mississippi	9	49	4,891	1,704	130	153	0	69	0	17
New York	41	189	-------	3	2,426	-------	33	2,482	1	48
Oregon	5	15	93	2	1,191	-------	5	223	5	10
Rhode Island	3	3	-------	-------	346	-------	4	105	0	0
South Dakota	4	16	7	-------	16	-------	0	281	52	3
Tennessee	12	124	234	83	6	13	5	223	1	20
Texas	46	478	874	1,220	51	24	6	393	1	53

October 1935

	Cases
Puerto Rico:	
Chicken pox	17
Dysentery	24
Filariasis	5
Mumps	33
Ophthalmia neonatorum	6
Puerperal septicemia	2
Tetanus	11
Tetanus, infantile	3
Trachoma	4
Whooping cough	88

November 1935

	Cases
Missouri:	
Chicken pox	351
Dysentery	17
Mumps	238
Rabies in animals	4
Septic sore throat	77
Tetanus	1
Trachoma	4
Tularaemia	4
Undulant fever	6
Whooping cough	188

December 1935

	Cases
Anthrax:	
Massachusetts	1
Chicken pox:	
Alabama	236
Colorado	608
Idaho	49
Illinois	2,429
Kansas	913
Louisiana	24
Massachusetts	1,537
Minnesota	1,097
Mississippi	438
New York	3,023
Oregon	226
Rhode Island	49
South Dakota	142
Tennessee	261
Texas	172
Dengue:	
Mississippi	2
Texas	6
Dysentery:	
Alabama (amoebic)	1
Illinois (amoebic)	13
Illinois (amoebic carriers)	92
Kansas (bacillary)	1
Louisiana (amoebic)	10
Louisiana (bacillary)	5
Massachusetts (amoebic)	2
Mississippi (amoebic)	26
Mississippi (bacillary)	204
New York (amoebic)	1
New York (bacillary)	18
Rhode Island (bacillary)	1
Tennessee (bacillary)	10
Texas (amoebic)	1
Texas (bacillary)	4
Epidemic encephalitis:	
Alabama	1
Illinois	3
Kansas	2
Louisiana	1
Massachusetts	10

December 1935—Continued

	Cases
Epidemic encephalitis—Continued.	
New York	10
Oregon	1
Tennessee	1
Texas	1
German measles:	
Alabama	1
Illinois	36
Kansas	16
Massachusetts	93
New York	186
Rhode Island	1
Tennessee	3
Hookworm disease:	
Louisiana	8
Mississippi	161
Tennessee	1
Impetigo contagiosa:	
Colorado	14
Illinois	4
Kansas	2
Oregon	55
Tennessee	1
Lead poisoning:	
Massachusetts	2
Mumps:	
Alabama	124
Colorado	323
Idaho	57
Illinois	748
Kansas	208
Louisiana	10
Massachusetts	1,239
Mississippi	552
Oregon	123
Rhode Island	118
South Dakota	135
Tennessee	52
Texas	492
Ophthalmia neonatorum:	
Alabama	6
Illinois	5
Louisiana	1
Minnesota	1
New York	1
South Dakota	1
Tennessee	5
Paratyphoid fever:	
Illinois	2
Louisiana	1
New York	6
Oregon	1
Tennessee	1
Texas	2
Puerperal septicemia:	
Mississippi	29
Tennessee	1
Rabies in animals:	
Alabama	77
Illinois	17
Louisiana	23
Massachusetts	13
Mississippi	24
New York [1]	3
Oregon	12
Texas	19
Scabies:	
Kansas	5
Oregon	34
Tennessee	7
Septic sore throat:	
Idaho	8
Illinois	4
Kansas	4

December 1935—Continued

	Cases
Septic sore throat—Con.	
Louisiana	6
Massachusetts	12
Minnesota	2
New York	197
Oregon	3
Rhode Island	8
Tennessee	9
Tetanus:	
Alabama	2
Louisiana	3
Massachusetts	3
New York	4
South Dakota	1
Tennessee	1
Trachoma:	
Illinois	41
Massachusetts	2
Minnesota	7
Mississippi	5
Oregon	1
South Dakota	10
Tennessee	1
Trichinosis:	
Massachusetts	2
New York	6
Tularaemia:	
Colorado	2
Illinois	12
Kansas	3
Louisiana	2
Minnesota	2
Tennessee	7
Texas	1
Typhus fever:	
Alabama	18
Louisiana	6
Mississippi	5
New York	2
Texas	30
Undulant fever:	
Alabama	3
Illinois	10
Kansas	15
Louisiana	4
Massachusetts	6
Minnesota	13
Mississippi	1
New York	16
Rhode Island	2
Texas	2
Vincent's infection:	
Colorado	4
Illinois	20
Kansas	9
New York [1]	64
Oregon	11
Tennessee	3
Whooping cough:	
Alabama	32
Colorado	35
Illinois	851
Kansas	101
Louisiana	36
Massachusetts	2,922
Minnesota	120
Mississippi	332
New York	1,518
Oregon	17
Rhode Island	53
South Dakota	9
Tennessee	47
Texas	47

[1] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Jan. 18, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	4	5	0	0	0	0	20	31
New Hampshire:											
Concord	0	------	1	0	1	1	0	0	0	0	7
Manchester	0	------	3	0	2	4	0	0	0	0	10
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	1	0	2	0	0	0	0	15
Rutland	0	------	0	1	1	3	0	0	0	0	5
Massachusetts:											
Boston	4	------	0	66	33	109	0	6	3	7	235
Fall River	1	------	0	0	4	4	0	1	0	0	39
Springfield	0	------	0	0	7	7	0	4	0	8	56
Worcester	0	------	0	0	12	20	0	3	0	7	60
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	------
Providence	1	------	0	0	7	11	0	2	0	6	61
Connecticut:											
Bridgeport	4	------	3	1	6	6	0	0	0	3	29
Hartford	0	------	0	0	3	3	0	1	0	4	42
New Haven	0	------	1	1	0	1	0	1	0	20	46
New York:											
Buffalo	1	------	1	10	22	55	0	7	1	10	149
New York	29	22	------	278	------	277	0	------	3	65	------
Rochester	0	------	0	0	7	4	0	1	0	2	80
Syracuse	0	------	0	6	7	32	0	1	0	30	52
New Jersey:											
Camden	1	------	0	1	4	3	0	1	0	2	43
Newark	0	5	0	1	11	60	0	6	0	28	108
Trenton	0	1	0	0	3	2	0	0	0	2	44
Pennsylvania:											
Philadelphia	4	1	1	208	39	96	0	23	1	61	494
Pittsburgh	2	------	2	25	28	90	0	4	0	27	162
Reading	0	------	0	1	5	2	0	1	0	0	37
Scranton	1	------	------	13	------	4	0	------	0	0	------
Ohio:											
Cincinnati	2	------	3	1	8	18	0	6	0	11	139
Cleveland	3	55	7	27	18	47	0	7	0	64	197
Columbus	4	1	1	1	7	14	0	4	0	2	109
Toledo	0	------	0	18	6	7	0	3	0	3	80
Indiana:											
Anderson	1	------	1	0	1	5	0	1	0	4	8
Fort Wayne	3	------	0	0	0	6	0	0	0	0	25
Indianapolis	2	------	2	4	26	26	0	5	0	15	131
Muncie	0	------	0	0	2	3	0	0	0	0	11
South Bend	0	------	0	0	5	3	0	1	0	1	19
Terre Haute	0	------	0	0	0	2	0	0	0	0	25
Illinois:											
Alton	3	------	0	0	2	3	0	0	0	1	8
Chicago	9	11	7	8	59	266	0	30	0	178	772
Elgin	0	------	0	0	1	3	0	1	0	0	14
Moline	0	------	0	0	3	15	0	0	0	0	10
Springfield	1	------	0	0	5	3	0	0	0	0	28
Michigan:											
Detroit	11	3	0	12	35	91	0	12	1	194	269
Flint	0	------	0	0	6	16	0	0	0	6	30
Grand Rapids	0	------	0	4	0	4	0	2	0	5	35
Wisconsin:											
Kenosha	0	------	0	0	0	4	0	0	0	6	18
Milwaukee	2	1	1	0	13	96	0	8	0	105	128
Racine	0	------	0	2	2	24	0	0	0	2	12
Superior	0	------	0	0	1	4	0	0	0	0	16
Minnesota:											
Duluth	0	------	0	5	3	1	0	0	0	3	23
Minneapolis	0	------	2	40	13	131	0	2	0	10	124
St. Paul	0	1	1	29	11	38	0	1	0	3	60
Iowa:											
Cedar Rapids	0	------	------	0	------	6	0	------	0	2	------
Davenport	0	------	------	0	------	7	0	------	0	0	------
Des Moines	1	------	------	0	------	3	0	------	0	0	40
Sioux City	0	------	------	4	------	5	18	------	0	0	------
Waterloo	2	------	------	31	------	6	0	------	0	4	------

City reports for week ended Jan. 18, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Missouri:											
Kansas City	1	------	0	1	13	15	1	0	0	1	104
St. Joseph	1	------	0	0	11	3	0	2	0	1	44
St. Louis	15	------	2	6	27	44	0	10	0	4	267
North Dakota:											
Fargo	5	------	0	1	1	6	0	1	0	0	6
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	------	0	------	4	0	------	0	0	9
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	1	------
Nebraska:											
Omaha	2	------	0	3	6	111	7	2	0	0	55
Kansas:											
Lawrence	0	------	0	0	1	0	0	0	0	0	11
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	2	1	1	0	5	26	0	0	0	0	39
Delaware:											
Wilmington	0	------	0	3	3	0	0	1	0	8	26
Maryland:											
Baltimore	3	5	6	3	37	31	0	14	1	15	250
Cumberland	0	------	0	0	0	3	0	0	0	0	10
Frederick	0	------	0	0	1	0	0	0	0	0	4
District of Col.:											
Washington	26	5	4	6	22	28	0	13	6	5	216
Virginia:											
Lynchburg	1	------	0	0	4	5	0	0	0	7	17
Norfolk	0	------	0	0	8	4	0	1	0	5	34
Richmond	0	------	0	0	4	6	0	1	1	3	62
Roanoke	2	------	0	0	3	7	0	0	0	0	16
West Virginia:											
Charleston	2	------	0	0	1	0	0	0	0	0	5
Huntington	1	------	------	0	------	3	0	------	0	0	------
Wheeling	0	------	0	1	3	1	0	1	0	0	24
North Carolina:											
Gastonia	0	------	0	0	0	1	0	0	0	0	------
Raleigh	0	------	0	0	1	1	0	0	0	0	10
Wilmington	0	------	0	0	0	1	0	0	0	1	3
Winston-Salem	0	------	0	3	1	4	0	2	0	0	20
South Carolina:											
Charleston	0	137	1	0	8	1	0	0	0	0	25
Columbia	0	------	0	0	0	0	0	0	0	0	3
Florence	0	------	0	0	1	1	0	0	0	0	7
Greenville	0	------	0	10	4	0	0	0	0	0	20
Georgia:											
Atlanta	5	83	6	1	13	8	0	8	1	0	93
Brunswick	0	------	0	1	1	1	0	0	0	1	4
Savannah	1	21	2	0	1	2	0	0	0	1	31
Florida:											
Miami	1	------	1	0	0	5	0	0	2	0	34
Tampa	1	------	0	0	4	3	0	1	0	0	33
Kentucky:											
Ashland	1	------	------	0	------	0	0	------	0	2	------
Covington	2	------	0	0	4	9	0	1	0	0	24
Lexington	0	------	0	0	8	3	0	2	0	0	25
Louisville	0	7	0	2	12	12	0	3	0	2	71
Tennessee:											
Knoxville	1	------	0	8	4	1	0	0	0	0	22
Memphis	5	------	0	1	16	10	0	9	0	8	91
Nashville	3	------	3	1	17	3	0	1	0	0	61
Alabama:											
Birmingham	4	------	4	0	13	4	0	3	1	4	85
Mobile	2	5	1	0	4	2	0	0	0	0	23
Montgomery	1	1	------	0	------	0	0	------	0	5	------
Arkansas:											
Fort Smith	1	------	------	0	------	2	0	------	0	0	------
Little Rock	0	------	0	1	11	0	0	4	0	0	17
Louisiana:											
Lake Charles	1	------	0	0	3	0	0	0	0	0	9
New Orleans	13	5	5	11	11	9	0	8	0	0	154
Shreveport	1	------	0	3	9	4	0	2	0	0	43
Oklahoma:											
Oklahoma City	1	------	1	0	8	7	0	0	0	0	80
Texas:											
Dallas	7	5	5	1	9	9	0	2	0	4	78
Fort Worth	5	------	0	0	8	6	0	2	0	0	50
Galveston	1	------	0	0	4	1	0	1	1	0	27
Houston	7	------	2	5	14	9	0	5	1	0	79
San Antonio	2	------	6	0	13	1	0	8	0	0	74

City reports for week ended Jan. 18, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Montana:											
Billings	0	------	0	0	0	20	0	0	0	1	8
Great Falls	0	------	0	1	1	2	2	0	0	6	10
Helena	0	------	0	0	0	0	0	0	0	0	2
Missoula	0	------	0	0	2	30	0	0	0	0	8
Idaho:											
Boise	0	------	0	0	1	11	0	0	0	0	5
Colorado:											
Colorado Springs	0	------	0	2	1	13	0	2	0	1	10
Denver	5	------	0	5	15	23	0	4	0	9	101
Pueblo	0	------	2	0	3	33	0	0	0	0	14
New Mexico:											
Albuquerque	1	1	0	0	0	4	0	2	0	0	9
Utah:											
Salt Lake City	0	------	0	2	1	78	0	0	0	9	30
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	1	26	9	27	4	4	0	8	98
Spokane	0	------	0	4	6	1	0	0	0	0	36
Tacoma	0	------	0	0	5	0	0	0	0	0	45
Oregon:											
Portland	1	------	1	120	3	14	0	2	0	2	90
Salem	0	------	------	1	------	0	0	------	0	0	------
California:											
Los Angeles	18	31	4	96	46	79	0	24	0	9	440
Sacramento	4	1	1	13	5	10	0	4	0	7	34
San Francisco	2	16	2	255	14	56	0	15	1	28	194

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:			
Boston	4	1	1
Worcester	2	0	0
Rhode Island:			
Providence	2	1	0
Connecticut:			
New Haven	0	1	0
New York:			
Buffalo	1	1	0
New York	17	------	3
New Jersey:			
Newark	3	1	1
Pennsylvania:			
Philadelphia	1	0	0
Pittsburgh	0	2	0
Ohio:			
Cincinnati	3	2	1
Cleveland	6	2	0
Indiana:			
Indianapolis	2	0	0
Illinois:			
Chicago	5	3	0
Michigan:			
Detroit	2	1	0
Iowa:			
Des Moines	2	0	0
Sioux City	1	0	0
Missouri:			
St. Joseph	1	0	0
Maryland:			
Baltimore	5	4	0
District of Columbia:			
Washington	6	1	0
Virginia:			
Norfolk	1	0	0
South Carolina:			
Charleston	1	0	0
Florida:			
Miami	1	1	0
Kentucky:			
Lexington	1	1	0
Louisville	2	1	0
Tennessee:			
Memphis	0	1	0
Alabama:			
Birmingham	0	0	1
Arkansas:			
Fort Smith	5	0	0
Little Rock	0	1	0
Louisiana:			
New Orleans	1	1	0
Shreveport	0	2	0
Oklahoma:			
Oklahoma City	2	1	0
Texas:			
Dallas	3	2	0
Houston	8	1	0
Washington:			
Seattle	1	0	0
California:			
Los Angeles	7	3	0
San Francisco	1	0	0

Dengue.—Cases: Miami, 1.
Epidemic encephalitis.—Cleveland, 1; Omaha, 1.
Pellagra.—Cases: Charleston, S. C., 1; Atlanta, 1; Savannah, 2; New Orleans, 1; Los Angeles, 1.
Typhus.—Cases: Atlanta, 1; Savannah, 2; Montgomery, 1; Fort Worth, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended January 11, 1936.—During the 2 weeks ended January 11, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	1					2
Chickenpox	1	17	25	254	753	106	66	7	149	1,378
Diphtheria		8	9	35	16	10	19			97
Dysentery					1					1
Erysipelas				12	12	7	1		5	37
Influenza		7			145	4			15	171
Lethargic encephalitis									1	1
Measles	6	66	19	584	2,392	408	650	32	358	4,515
Mumps		7			775	130	526	3	218	1,659
Paratyphoid fever					2					2
Pneumonia	7	1			24		5		12	49
Poliomyelitis					1					1
Scarlet fever		35	12	193	539	101	55	22	84	1,041
Smallpox								1		1
Trachoma						1			10	11
Tuberculosis	1	4	12	49	116	25	31	1	24	263
Typhoid fever			3	30	8	2		1		44
Undulant fever				1	1					2
Whooping cough	8	104		69	467	46	86	7	44	831

CUBA

Habana—Communicable diseases—4 weeks ended January 18, 1936.—During the 4 weeks ended January 18, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1		Scarlet fever	2	
Diphtheria	22		Tuberculosis	42	9
Malaria	[1] 74	1	Typhoid fever	[1] 38	8

[1] Includes imported cases.

ITALY

Communicable diseases—4 weeks ended October 13, 1935.—During the 4 weeks ended October 13, 1935, cases of certain communicable diseases were reported in Italy as follows:

Disease	Sept. 16-22		Sept. 23-29		Sept. 30-Oct. 6		Oct. 7-13	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	46	39	32	25	41	35	30	28
Cerebrospinal meningitis	7	7	9	9	2	2	4	4
Chickenpox	55	40	75	51	83	43	85	56
Diphtheria and croup	459	256	435	241	443	255	494	259
Dysentery	30	22	16	15	15	12	21	18
Hookworm disease	13	9	24	13	4	4	25	6
Lethargic encephalitis	2	2			1	1	2	2
Measles	428	157	370	138	420	128	508	153
Paratyphoid fever	132	82	158	117	128	93	130	98
Poliomyelitis	21	21	84	24	29	23	24	18
Puerperal fever	28	23	36	34	43	39	46	42
Scarlet fever	383	142	377	141	378	160	378	172
Typhoid fever	1,160	546	1,155	547	953	478	990	496
Undulant fever	36	28	25	23	21	18	24	19
Whooping cough	104	80	154	62	192	64	225	59

PANAMA CANAL ZONE

Communicable diseases—October–December 1935.—During the months of October, November, and December 1935, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	October		November		December	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	1				6	
Diphtheria	13		6		5	
Dysentery (amebic)	27		32	3	23	
Dysentery (bacillary)	1		8	2	2	1
Leprosy	1					1
Lethargic encephalitis	1				1	
Malaria	96	3	86		61	1
Measles	2				1	
Meningococcus meningitis			1	1		
Mumps	1				2	
Pneumonia		24		35		30
Poliomyelitis	1					
Scarlet fever	1					
Tuberculosis		28		28		34
Typhoid fever	1		3	2		
Typhus fever	5		1		1	
Whooping cough	2				1	

YUGOSLAVIA

Communicable diseases—December 1935.—During the month of December 1935, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	39	5	Paratyphoid fever	14	2
Cerebrospinal meningitis	13	7	Scarlet fever	856	10
Diphtheria and croup	898	92	Sepsis	17	8
Dysentery	91	25	Tetanus	20	7
Erysipelas	302	19	Typhoid fever	548	75
Lethargic encephalitis	6	3	Typhus fever	19	1
Measles	763	9			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for January 31, 1936, pages 122–137. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued February 28, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India—Northwest Frontier Province.—One case of cholera was reported in Northwest Frontier Province, India, during the week ended January 18, 1936.

Plague

Ceylon—Colombo.—During the week ended January 11, 1936, two fatal cases of plague were reported in Colombo, Ceylon.

Smallpox

India—Calcutta.—On January 8, 1936, smallpox was reported to be epidemic in Calcutta, India.

Yellow Fever

Brazil—Minas Geraes State.—On December 27, 1935, one fatal case of yellow fever was reported at Santa Rita de Cassia, Minas Geraes State, Brazil. Three fatal cases of yellow fever occurred at Passos from December 28, 1935, to January 4, 1936, and three fatal cases at Altinopolis from December 27 to 31, 1935.

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W. F. DRAPER, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

December 29, 1935 to January 25, 1936

Meningococcus meningitis.—This disease, which has been for more than a year at a relatively high level, maintained the same high level during the month of January. For the 4 weeks ended January 25 the number of cases totaled 668, which was more than twice the number reported for the corresponding period in 1935 and more than three times the number in 1934. The current incidence was the highest for this period since 1930, when 942 cases were reported.

Every section of the country has been more or less affected by the prevailing high incidence of meningitis. In the South Central sections every State reported an increase during the current period over the corresponding period last year, while in the South Atlantic group each State, except Virginia, reported an increase. In the South Central sections the number of cases (224) was more than three times that for the same period in each of the 2 preceding years. In the South Atlantic group the number (107) was almost twice that for last year and more than four times the figure for 1934. In other sections the high incidence was confined to certain States. The States mostly responsible for significant increases in other sections were New York (71 cases), Massachusetts (15 cases), New Jersey (14 cases), Illinois (45 cases), Iowa (18 cases), and Colorado (10 cases).

During the last week of the 4 weeks under review the number of cases dropped about 15 percent from that for the preceding week (197 cases); but, as the peak of the disease is not usually reached until March or April, a higher level may still be attained.

[1] From the Office of Statistical Investigations, U S Public Health Service These summaries include only the 8 important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers The numbers of States included for the various diseases are as follows Typhoid fever, 48, poliomyelitis, 48, meningococcus meningitis, 48, smallpox, 48, measles, 47, diphtheria, 48, scarlet fever, 48, influenza, 44 States and New York City The District of Columbia is counted as a State in these reports.

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Influenza.—Reports indicated only the normal seasonal increase of influenza during the 4 weeks ended January 25, with 9,900 cases reported, approximately 4,400 more than for the preceding 4 weeks. In relation to preceding years the current incidence was only about 30 percent of that reported for the corresponding period last year, but was 10 percent above the incidence in 1934. The epidemic of 1932–33 had already reached its peak and had dropped considerably during this period in 1933, but the number of cases was still large (143,877). The highest incidence for the current period was reported from the South Atlantic (3,017 cases) and South Central (4,088 cases) regions, where the disease was also unusually prevalent at this time last year; the current incidence, however, compares favorably with more normal years.

Scarlet fever.—The incidence of scarlet fever continued to increase. For the 4 weeks ended January 25 there were 28,658 cases reported, the highest incidence for this period in the 8 years for which data are available. For the corresponding period in 1935, 1934, and 1933 the numbers of cases totaled 24,469, 21,359, and 21,507, respectively. In the West North Central region, where the disease was unusually prevalent during the year 1935, the current incidence (5,025 cases) was 2.5 times the incidence for the corresponding period last year, and in the Mountain and Pacific regions, where the incidence was also high during the entire year, the number of cases (5,182) was almost twice that of last year. A slight increase was reported from the New England and Middle Atlantic States, but in all other regions the disease was less prevalent than at this time last year.

Measles.—The seasonal increase of measles was somewhat slower than in recent years of normal measles incidence. For the 4 weeks ended January 25 the number of cases reported totaled 18,801, as compared with 21,656, 27,486, and 29,666 for the corresponding period in the years 1933, 1932, and 1931, respectively. In the years 1935 and 1934 measles were unusually prevalent at this time, with 54,707 and 51,498 cases, respectively. The disease continued to be unusually prevalent in the Mountain and Pacific regions, but in other regions the incidence stood near the seasonal expectancy.

Poliomyelitis.—The incidence of poliomyelitis continued to decline through the month of January. For the 4 weeks ended January 25, 79 cases were reported, as compared with 118, 98, and 82 for the corresponding period in the years 1935, 1934, and 1933, respectively. Of the total number of cases, California reported 14, New York 10, Pennsylvania 6, and New Jersey, Maine, and Illinois, 5 each. For the country as a whole the current incidence was the lowest for this period in the 8 years for which data are available.

Typhoid fever.—The incidence of typhoid fever remained low. For the 4 weeks ended January 25 the number of cases, 434, was less than 70 percent of the number reported for this period in each of the 2 preceding years. In the West North Central and Mountain and Pacific regions the incidence was practically on a level with that of last year, but all other regions reported decreases ranging from 10 percent in the South Atlantic to almost 50 percent in the South Central regions.

Diphtheria.—The number of cases of diphtheria reported for the current 4-week period, 3,001, was about 90 percent of that for the corresponding period last year and approximately 70 percent of the number for this period in each of the 2 preceding years. The incidence was slightly higher than last year in the South Atlantic region, approximately the same in the East North Central region, and about 80 percent of the figure of last year for each of the other geographic areas. For the country as a whole the current incidence was the lowest in the 8 years for which data are available.

Smallpox.—For the 4 weeks ended January 25 a total of 865 cases of smallpox was reported, as compared with 751, 498, and 642 cases for the corresponding period in 1935, 1934, and 1933, respectively. For this period in 1932 the number of cases totaled 2,084. The high incidence of smallpox is still confined to States in the Mountain and Pacific and North Central regions. Each State in the West North Central group reported an increase over the total for last year for this period, while in the East North Central group only Illinois and Wisconsin reported more than the seasonal expectancy Montana, Colorado, and Washington in the Mountain and Pacific regions continued to report a high incidence. In the South Atlantic and South Central regions the incidence was low.

Mortality, all causes.—The average mortality rate from all causes in large cities for the 4 weeks ended January 25, as reported by the Bureau of the Census, was 13.4 per 1,000 inhabitants (annual basis). For the corresponding period in the years 1935, 1934, and 1933 the rates were 13.3, 12.6, and 13.1, respectively. For the first 3 weeks of the period the rates were slightly higher than those for the corresponding weeks last year, but during the fourth week the rate dropped to the level of last year.

RESULTS OF FIELD STUDIES WITH THE BRODIE POLIOMYELITIS VACCINE [1]

By A. G. GILLIAM, *Assistant Surgeon*, and R. H. ONSTOTT, *Passed Assistant Surgeon, United States Public Health Service*

During the past year lay and medical interest in vaccination against poliomyelitis has been much aroused. With the advent of the 1935 poliomyelitis season it became evident that this interest would be translated into fairly widespread use of the proposed vaccines as prophylactics for the disease. It appeared to the Public Health Service that there was insufficient evidence to justify any general recommendation of them as prophylactics. On the other hand, the vaccine prepared by Dr. Brodie appeared on theoretical and experimental grounds to be reasonably safe, and seemed to offer some hope as a preventive. Realizing that its use would probably be rather extensive, it was felt worth while to observe its application in controlled studies designed to determine its efficacy in preventing poliomyelitis under field conditions. So far as we are aware, no rigidly controlled clinical study has been undertaken to evaluate this or any other vaccine. It was fully appreciated that the chance of reaching a definite conclusion was slight, and was dependent upon the subsequent development of a sharp outbreak of the disease in the study area, but it was believed that such an attempt should nevertheless be made.

This paper deals with the results of such studies conducted during the past summer in North Carolina and Virginia. The data presented are limited, but their implications on the administrative and scientific problems involved in evaluating a poliomyelitis vaccine make their presentation seem worth while.

On May 30, 1935, one of us arrived in Raleigh, N. C., at the request of the State Health Department. After consultation with officials of the department it was decided to offer assistance in vaccine studies in communities not then involved in the beginning outbreak. For reasons of administrative convenience, urban centers were desired as study points rather than rural areas.

It also seemed desirable to avoid communities in which there was already an unusual incidence of poliomyelitis, in order to reduce the risk of vaccinating individuals in the incubation period of the disease.

Because of particular interest shown in Greensboro by two practitioners and the health officer, Dr. C. C. Hudson, this city was selected as the first center for the trial. Greensboro was about 80 miles west

[1] This paper was read, in part, at the meeting of the southern branch of the American Public Health Association in St Louis, Mo., Nov. 19, 1935. The article, as read there, was published in the American Journal of Public Health for February 1936.

of the heavily infected focus; but since the epidemic began early in the poliomyelitis season, it seemed reasonable to suppose that Greensboro would eventually be involved. Doctor Hudson arranged a meeting of the physicians there and the proposed study was thoroughly discussed.

It was desired to use the vaccine under conditions simulating those under which it would ordinarily be used, except that the choice of individuals to receive it should, so far as possible, be uninfluenced by any factors which could conceivably affect the results, and that the follow-up on the vaccinated and unvaccinated be coordinated. The patient-physician relationship was maintained.

Doctor Hudson and the local medical society prepared a statement (approved by one of us) offering the vaccine to the public in the following manner:

The vaccine was offered frankly for study purposes—to determine its efficacy in preventing poliomyelitis under field conditions. It was considered worthy of hope as a prophylactic and reasonably safe. Parents desiring vaccine for their children under 8 years of age were instructed to list name, age, color, and sex of each applicant with their own physician. The physicians' lists would then be turned over to one of us who would arbitrarily divide them so that half would receive vaccine and half be held as controls. It was made clear that the private physician would have no voice in this selection. The inoculations were to be done in the physicians' offices during office hours and those selected would be notified by us when to report for vaccination. No effort was made to urge vaccination, or to urge physicians to recommend it.

Lists were received from physicians in the third week in June. The names of applicants were arranged alphabetically and approximately the last half of each list was selected for vaccination and the first half held as controls.

The physicians had some hesitancy in administering the vaccine, and an effort was made for one of us to be present with each physician to assist in his first inoculations.

With the announcement of the Greensboro study, Dr. Brodie, who cooperated fully, not only in supplying the vaccine but in every other manner possible, simultaneously discontinued sending vaccine to North Carolina except at our direction. Requests received by him from individuals and physicians were submitted to us. The requests coming through him and those received directly from physicians in other parts of the State were numerous, and much pressure was exerted upon us by some physicians for vaccine for their children and private patients. These were uniformly refused with the statement that vaccine given under our supervision would only be used in

controlled studies. Where possible we visited localities from which many such requests were received, and because of such requests Wilmington and Washington, N. C., with the cooperation of the health officers, Dr. A. H. Elliott and Dr. D. E. Ford, were later selected as study sites. These were the only places in North Carolina offering the opportunity for such study.

A number of communities in Virginia, through their health officers, requested that they be selected as study sites. In six of these places the problem was discussed with the health officers and the physicians and the decision was reached that it was too late to attempt any work. However, in Petersburg and adjoining Colonial Heights arrangements were made with the physicians and the health officer, Dr. Mason Romaine.

The same general procedure followed in Greensboro was used in these areas except that, profiting by the Greensboro experience, a time limit of 1 week was set for listing names; the upper age limit was raised to 10 years in Petersburg; and the administration of the vaccine was demonstrated to physicians as a group rather than by giving assistance to each individually.

In the four localities, 1,452 individuals, representing 7.2 percent of the eligible child population, requested vaccine, of whom 766 were selected by the method described above to receive it, and 686 remained as controls. Of the 766 selected, only 458 reported for inoculation, representing 2.3 percent of the child population (table 1).

TABLE 1.—*Eligible population, number requesting vaccine, number vaccinated, and number of controls, by locality*

	Greensboro, N. C.	Petersburg and Colonial Heights, Va.	Washington, N. C.	Wilmington, N. C.	Total
Eligible child population [1]	8,922	6,272	1,043	3,908	20,145
Number requesting vaccine	883	264	50	255	1,452
Percent requesting vaccine	9.9	4.2	4.8	6.5	7.2
Selected for vaccination	451	142	28	145	766
Selected for controls	432	122	22	110	686
Number selected and vaccinated	232	118	13	95	458

[1] From U. S. Census, 1930. Population in irregular age groups estimated by interpolation. Greensboro, 0–7 years, inclusive; Petersburg and Colonial Heights, 0–10 years, inclusive; Wilmington, 2–7 years, inclusive; Washington, 0–7 years, inclusive.

The age distributions of the eligible child population of the study areas and of the children requesting and receiving vaccine are shown in table 2. Of the total number inoculated, 1.3 percent were under 1 year of age; 48.9 percent were 1–4 years; and 49.7 percent were 5–10 years of age. Negroes comprised 16 percent of those receiving vaccine.

TABLE 2.—*Age distribution of (1) total eligible population of study areas, (2) children requesting vaccine, and (3) children vaccinated*

Age	Eligible population of study area		Children requesting vaccine		Children vaccinated	
	Number [1]	Percent	Number [2]	Percent	Number	Percent
Under 1	1,626	8.1	28	1.9	6	1.3
1-4	8,627	42.8	754	51.9	224	48.9
5-9	9,292	46.1	639	44.0	215	46.9
10	600	3.0	31	2.2	13	2.8
Total	20,145	100.0	1,452	100.0	458	100.0

[1] From U. S. Census, 1930. See footnote, table 1.
[2] 92 children of unknown age, but presumably 0–7 years of age were distributed in the same ratio as the children of known age (0–7 years).

Table 3 shows the dates on which the vaccinations were actually started in the four study areas and the dates on which the inoculations of the first doses were completed.

TABLE 3.—*Dates vaccinations were started and inoculations of first doses completed*

	Greensboro, N. C.	Petersburg, Va.	Washington, N. C.	Wilmington, N. C.
Date vaccination commenced	June 26	Aug. 8	July 30	Aug. 7
Date inoculation first doses completed	Aug 5	Aug. 16	July 30	Aug. 12
Percent of first doses completed—	*Percent*	*Percent*	*Percent*	*Percent*
In first week of vaccinations	43	78	100	100
By end of second week	68	100		
By end of third week	85			
By end of fourth week	97			

Various methods of inoculation and various inoculation sites were used by individual physicians. Dr. Brodie has recommended 1 to 2 cc given intracutaneously and the remainder of a 5-cc dose subcutaneously on each of the two dates of injections 14 days apart. For uniformity of dosage we recommended 1 cc intracutaneously and 4 cc subcutaneously.

To avoid pain from the injection of such a large volume of vaccine, prior use of 0.5 percent to 1.0 percent novocaine was at first recommended. This was given up because the increased quantity of material injected in a small area and the extra introduction of the needle seemed to outweigh the advantages of the novocaine.

Following Dr. Brodie's advice, it was recommended to give the second dose on the fourteenth day following the first. Of the 458 inoculated, 422 received two doses and 36 only one dose. Of the 422 receiving two doses, 16 (3 percent) had their second dose less than 2 weeks from the first; 326 (77 percent) had their second dose on the fourteenth day; 70 (17 percent) in the third week; and 10 (2 percent) over 3 weeks following the first dose.

REACTIONS

Physicians administering the vaccine were requested to record all local and general reactions. However, to make the observations uniform we attempted to see the vaccinated children at about the time of the second dose and about 1 month following it. At these visits inquiry was made regarding reactions, the inoculation sites were examined where possible, and inquiry was made regarding symptoms which might have represented unrecognized abortive poliomyelitis. Such visits were completed in 88 percent of the vaccinated. Inquiry was also made in 71 percent of the controls as to symptoms which might have resulted from unrecognized abortive poliomyelitis. This was in addition to the routine reporting by the physicians of all cases of suspected poliomyelitis.

It was found that such follow-up visits were necessary to secure an estimate of the reactions. Either because the physicians' findings were not recorded or because they did not see the patients again after vaccination, many reactions were noted only by means of our follow-up visits. For example, there was no note on the physicians' cards of 6 of the 14 abscesses which occurred. It also developed that three children recorded as receiving the vaccine had not been inoculated and that four controls had been inoculated with no record of the vaccinations given us. (These and six other controls inoculated and recorded are not included in the study group.)

On the basis of our records in the 403 vaccinated children seen by us, and the physicians' records in 55 cases not seen by us, 229 individuals (50 percent) were found to have had local reactions consisting of one or more of the following conditions:

a. Redness and swelling 1 inch or more in diameter and lasting longer than 48 hours;
b. Local pain lasting longer than 48 hours;
c. Local suppuration or necrosis;
d. Induration lasting 3 weeks or longer.

Local reactions, as above defined, are listed in table 4 for each of the study areas. In addition to the reactions noted, should be mentioned the rather intense pain usually accompanying the administration of the vaccine and lasting from 5 to 15 minutes.

TABLE 4.—*Local reactions (as defined in text)*

	Greensboro, N. C.	Petersburg, Va.	Wilmington, N. C.	Washington, N. C.	Total
Number of individuals inoculated	232	118	95	13	458
Number having local reactions [1]	129	50	44	6	229
Percent having local reactions	56	42	46	46	50
Number having abscesses	13	0	1	0	14
Percent having abscesses	5.6	0	1	0	3

In the Greensboro series, reactions followed 48 percent (178 out of 374) of the inoculations preceded by novocaine, while they occurred in only 17 percent (11 out of 64) of those not preceded by novocaine. No novocaine was used in the other localities.

In the 4 study areas, 458 individuals received 880 inoculations—458 first doses and 422 second doses. Local reaction of some degree followed 24 percent of the first inoculations and 43 percent of the second. As a group, the reactions from the second dose were generally more severe than those following the first dose, although the vaccine administered was the same in amount for each.

There was no correlation between local or general reactions and the time interval between the two doses. In Petersburg, Washington, and Wilmington, where lot numbers were usually recorded, there was no correlation between vaccine lots and reactions.

Two children who had had antirabic treatment in the summer of 1934 had no local or general reaction following the Brodie vaccine.

Of the local reactions recorded, only 15 were out of the ordinary. One of these was a fairly severe urticaria occurring around the site of the subcutaneous inoculation on the seventh day in a child with an allergic history; 10 were abscesses at the site of the subcutaneous inoculation that were opened surgically or opened spontaneously; and 4 were fluctuant masses 1 inch to 2 inches in diameter which had not opened. Most of the abscesses cleared up promptly following drainage, although several were very slow to heal, the area filling in with indolent granulation tissue. There were also 15 instances of superficial slough 3 to 5 mm in diameter at the site of the intracutaneous inoculation.

General reactions following the vaccine were observed in 17 children (3.7 percent), and in 4 of them they were, at the time, very disturbing. Résumés of the histories of these four are as follows:

1. Within 30 seconds after the administration of her first dose, a white female, 2 years of age, fainted, became cyanotic, and stopped breathing. After 10 to 15 minutes of manual and mouth-to-mouth artificial respiration she recovered and suffered no further ill effects. She had no reaction following the second dose.

2. On the third day after her only dose, a white female, 5 years of age, developed what was diagnosed as an acute inflammatory rheumatism of both knees. She had a high fever for 3 days and was confined to bed for 10 days. When seen 3 weeks following vaccination, her knees were still swollen but not tender, and the child was extremely weak and underweight. Seen again 7 weeks after inoculation, she had gained weight and strength and suffered no apparent disability.

3. About 10 minutes after the first dose, a white male, 5 years of age, felt faint, nauseated, and became very pale. He had a "medicine taste" in his mouth. After lying down 30 minutes he felt all right. His parents state that he now has no appetite, has lost weight and strength, and appears anemic and listless. He was not given the second dose.

4. A white male, 6 years of age, complains of occasional cramping pain in the leg, the site of the second subcutaneous inoculation. One month after inoculation these cramps are less frequent and less severe but still occasionally present.

An additional 13 children had fever of 101°–104° for 1 to 2 days and were listless. In 10 of these the fever occurred in the first 3 days following the inoculation. In the other 3 it was associated with abscesses and subsided when they opened. Several of them had headaches and were nauseated.

GENERAL DISCUSSION

The evaluation of the efficacy of a vaccine against poliomyelitis introduces problems peculiar to any disease carrying a low morbidity rate, and factors inherent in human nature itself. The sample of the population tested must be adequate enough, in point of numbers, to satisfy elementary requirements of the theory of probability. It must also be a good sample "fairly representative qualitatively of the universe from which it is drawn." To get a good sample is primarily and fundamentally a biologic problem and one which may involve intangible elements not easily susceptible to statistical treatment. It is usually relatively simple to obtain a good sample with regard to such variables as age, sex, race, and geographic location, or at least it is usually possible to correct for any discrepancies which may develop in them. It is impossible, however, to determine what selective influences make one individual apply for a vaccine and another not apply; and, further, it is impossible to know what effect these factors might have on the results.

In this study, 1,452 persons applied for vaccine. Following the receipt of applications, 15 cases of poliomyelitis were reported in other children of the same age in the same communities. The rate these cases represent out of the total eligible child population, applied to the 1,452 applicants, gives an expectancy of 1.09±1.03 cases among those in the study group (table 5). In other words, one would have expected the chance occurrence of from 0 to 2 cases in the study group. Actually, no cases were reported. These figures are too small for any real significance, and the cases expected are within the same numerical range as the cases observed. They suggest, however, the necessity for showing, in any series, whether or not those applying for vaccine are subject to the same risk of acquiring poliomyelitis as other individuals in the same community.

TABLE 5.—*Calculation of expected cases among applicants for vaccine*

Age	Study area			Vaccine applicants	
	(1) Number	(2) Cases [1]	(3) Rate	(4) Number	(5) Expected cases (3) x (4)
Under 1	1 626	0	0 00078	28	0 60996
1–4	8,627	8		754	
5–9	9,292	7	00071	639	47570
10	600	0		31	
Total	20,145	15	00074	1,452	1 08566

[1] Cases reported in study area from time of receipt of vaccine requests through Oct 19, 1935

It is therefore obvious that the sample of population vaccinated should be adequately controlled with an equally large group of unvaccinated also chosen arbitrarily from the vaccine applicants. It is not enough to vaccinate all applicants and retain as controls other children in the same community who did not apply. The division of applicants into vaccinated and controls must be impartial.

The sample of population tested should also be uniformly exposed. At the present time the bulk of available evidence indicates that during epidemic periods the virus of poliomyelitis is widely disseminated and operating in a host population which is relatively insusceptible. Until practicable methods of carrier determination and adequate tests for susceptibility are evolved, it appears necessary to depend upon size of sample to equalize factors of exposure and susceptibility in vaccinated individuals and controls.

The adequacy of the sample, in point of numbers, necessary to eliminate errors arising through chance differences, is amenable to calculation [2] and is directly dependent upon the attack rate prevailing in the area in which the test is conducted. In table 6 are listed attack rates necessary, with varying numbers of applicants for vaccine, to bring an 80-percent difference in rates in vaccinated and controls above different levels of sampling reliability. For example, for an 80-percent difference in the attack rate in 500 vaccinated individuals and the attack rate in 500 controls to occur by chance alone in only 7 such samples out of 1,000, the general attack rate in the area must be at least 2,229.90 per 100,000 of population. With the same number of vaccinated individuals and controls, an 80-percent difference would occur 20 times in 100 by chance alone in an area in which the general attack rate is only 265.31 per 100,000, and this difference, in an area with such a low attack rate, could not reliably be attributed to vaccination.

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[2] In an area in which the general attack rate in unvaccinated individuals is p (the rate per 100,000 being 100,000 p), if the vaccine were 80 percent effective, one would expect this rate (p) to prevail in n unvaccinated controls and a rate of $0.2p$ to prevail in n vaccinated individuals. In order, however, that the difference (x) between the rate in the unvaccinated and the rate in the vaccinated ($x=1.0p-0.2p=0.8p$) be above the level of sampling error, the number of vaccinated (n) and the number of unvaccinated controls (n) must be sufficiently large. The number required in each group for final results which are statistically significant may be calculated as follows:

Number of vaccinated $=n$ Rate in vaccinated $=0.2p$
Number of unvaccinated $=n$ Rate in unvaccinated $=1.0p$

$$\text{Difference}=x=1.0p-0.2p=0.8p$$

	Attacked	Not attacked	Total
Vaccinated	$0.2pn$	$(1-0.2p)n$	n
Unvaccinated	$1.0pn$	$(1-1.0p)n$	n
Total	$1.2pn$	$(2-1.2p)n$	$2n$

$$\text{Total rate in study group}=\frac{1.2pn}{2n}=0.6p$$

In order to avoid the immediate assumption that the rate in the vaccinated is really different from the rate in the unvaccinated, the standard deviation (σ) of the rate in each group is taken as the standard deviation of the average rate. Thus the standard deviation of the rate in the vaccinated and of the rate in the unvaccinated would both be expressed as follows:

$$\text{Standard deviation}=\sigma=\sqrt{\frac{0.6p(1-0.6p)}{n}}$$

In order that an observed difference (x) in the attack rates in the two groups equal to 80 percent be significant to the extent that it would occur by chance alone only once in 100 such samples (i. e., P, or chance probability $=0.01$), the difference divided by the standard deviation of the difference $\left(\frac{x}{\sigma_x}\right)$ must equal 2.3267.*

Thus

$$\frac{x}{\sigma_x}=\frac{0.8p}{\sqrt{\frac{0.6p(1-0.6p)}{n}+\frac{0.6p(1-0.6p)}{n}}}$$

and if

$$\frac{x}{\sigma_x}=2.3267$$

then

$$2.3267=\frac{0.8p}{\sqrt{\frac{0.6p(1-0.6p)}{n}+\frac{0.6p(1-0.6p)}{n}}} \qquad (1)$$

solving (1) for n,

$$n=\frac{6.496240-3.897744p}{0.64p} \qquad (2)$$

Similarly, to bring a 100-percent difference (i. e., a vaccine 100 percent effective) above the same level of sampling error,

$$n=\frac{5.413533-2.706767p}{p} \qquad (3)$$

---

* Interpolated from Table of Areas and Ordinates of the Normal Curve: Pearl, Raymond: Introduction to Medical Biometry and Statistics, p. 440. W. B. Saunders, 1930.
Since it is desired to measure only positive deviations, P is calculated on the basis of the area of half the curve.

Table 6.—Specific attack rates (per 100,000 of population in the area concerned), necessary to demonstrate a vaccine 80 percent effective, at different degrees of sampling reliability, for different numbers of applicants

Number of applicants (2n)	P [1]=0.007	P=0.01	P=0.05	P=0.10	P=0.20
1,000	2,229.90	2,005.65	1,008.62	613.76	265.31
5,000	450.60	405.03	202.71	123.12	53.13
10,000	225.71	202.76	101.41	61 58	26.57
25,000	90.36	81.16	40.58	24.64	10.63
50,000	45.19	40.59	20.29	12.32	5.31
100,000	22.60	20.30	10.15	6.16	2.66
200,000	11.30	10.15	5.07	3.08	1.33

Calculation:

For item 2 in 2d column, where P=0.01, $\frac{x}{\sigma_x}=2.3267$; [2]

and, solving equation (1) in footnote on page 168 for p,

attack rate $=p=\frac{6.496240}{0.64n+3.897744}$. If $2n=5{,}000$, $n=2{,}500$, and $p=0.0040503=405$ 03 per 100,000.

Where P=0.007, $\frac{x}{\sigma_x}=2.4550$[2]; where P=0.01, $\frac{x}{\sigma_x}=2.3267$[2]; where P=0.05, $\frac{x}{\sigma_x}=16450$[2]; where P=0.10, $\frac{x}{\sigma_x}=1.2817$[2];

where P=0.20, $\frac{x}{\sigma_x}=0.8418$.

[1] P=probability that difference between attack rates in controls and attack rates in vaccinated equal to or greater than 80 percent occur through chance alone.
[2] Pearl: Op. cit.

In this study, an attack rate of 74 cases per 100,000 of population eligible for vaccination prevailed in the 4 study areas following the beginning of inoculations. Had the vaccine been 100 percent effective, a sample of approximately 15,000 candidates,[3] 7,500 vaccinated and 7,500 controls, would have been necessary in order that the difference between the number of cases in the vaccinated and the number of cases in the controls would occur by chance alone only once in 100 such samples. With the same prevailing rate, and the vaccine only 80 percent effective, a sample of approximately 27,000 candidates would have been necessary. The inclusion of individuals of older ages than those eligible in this study would tremendously increase the size of sample required because of the sharp decline in attack rate as age progresses. The above figures are also predicated on reported cases, about 15 percent of which were abortive. For an unequivocal evaluation it would probably be more reliable to use only paralytic cases, because of diagnostic difficulties and because paralysis is, after all, what it is desired to prevent. The sample necessary in this study would be increased if it were calculated on the basis of the paralytic rate.

[3] This calculation is based on the assumption that all inoculations were completed on the first day of vaccination in each area and that immediate immunity followed. Because of the small amount of data here considered, a strictly accurate calculation taking account of lags in vaccination and in immunity is not attempted. The effect of such calculation would be to lower materially the general attack rate prevailing after effective vaccination and to correspondingly increase the size of sample necessary for statistically significant results.

Selection of vaccinated individuals and controls by the method used in this study is, so far as we are aware, open to only one serious scientific criticism. Of the 766 children selected to receive vaccine, only 458 reported for inoculation. We have no way of knowing how many or which of the controls, had they been selected, would have refused the vaccine. It must be stated, however, that in any method of using arbitrarily selected human controls, constant vigilance and supervision by an impartial observer appear necessary. Methods of circumvention of the rules set down are numerous and, for adequate studies, must be carefully guarded against. For example, in this study 13 names appeared on 2 or more physicians' lists, and the parents frankly admitted that they hoped for favorable selection on one of them. A number of notification cards were returned by the post office as "addressee not known". Were some parents giving several names, thinking that a method of selecting alternate names was being used? The parents of a few children selected as controls were persistent in their efforts to get vaccine, and 10 of them were known to have succeeded in receiving it. Several physicians cooperating were considerably annoyed by the demands of a few controls, and one physician stated that he had lost two patients because he had followed the rules and refused their requests.

It therefore appears that the considerations brought out in this study—pyschologic, administrative, and scientific—present problems which, in the aggregate, make the unequivocal evaluation of a poliomyelitis vaccine a matter of extreme difficulty.

SUMMARY

1. The administrative procedures employed in conducting field trials of the Brodie poliomyelitis vaccine in North Carolina and Virginia during the summer of 1935 have been outlined.

2. In the 4 study areas, 1,452 applications for vaccine were received, of which 766 were selected for vaccination and 686 held as controls. Four hundred and fifty-eight of those selected were inoculated, 422 with 2 doses and 36 with 1 dose. In addition, 10 controls were known to have been inoculated. No cases of poliomyelitis were reported in any of the 1,452 candidates, and, hence, no conclusions concerning the efficacy of the vaccine can be reached from this study.

3. Local reactions occurred in 50 percent of those inoculated but were not of serious import except in 3 percent (14 abscesses).

4. General reactions were observed in 17 instances (3.7 percent), 4 of which were temporarily very disturbing.

5. In an area where the controls were as much spared from epidemic prevalence as were the children in the localities in North Carolina and Virginia where this study was conducted, and with all possible safeguards as to impartial division of applicants, 7,500 vaccinated

children, together with 7,500 controls would have been necessary to show conclusively the value of a perfect vaccine against poliomyelitis.

If the vaccine gave perfect immunity in only 80 percent of the persons vaccinated, a total of 27,000 children would have been necessary.

ACKNOWLEDGMENTS

The cooperation of Dr. William H. Park and Dr. Maurice Brodie, the State Health Departments of North Carolina and Virginia, and the health officers, physicians, and public of the study areas is gratefully acknowledged. It is impossible for one not implicated to appreciate the difficulties imposed on the health officers and the private physicians cooperating in a study of this sort.

The method employed in calculating the size of sample necessary is from Prof. Lowell J. Reed, of the School of Hygiene and Public Health, the Johns Hopkins University, by personal communication.

The general planning and supervision of this study were under the direction of Medical Director J. P. Leake, United States Public Health Service.

DEATHS DURING WEEK ENDED JANUARY 25, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan 25, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	8,957	8,975
Deaths per 1,000 population, annual basis	12 5	12 5
Deaths under 1 year of age	507	541
Deaths under 1 year of age per 1,000 estimated live births	46	50
Deaths per 1,000 population, annual basis, first 4 weeks of year	13.4	13.3
Data from industrial insurance companies:		
Policies in force	67,742,282	67,084,807
Number of death claims	14,877	14,612
Death claims per 1,000 policies in force, annual rate	11.5	11 4
Death claims per 1,000 policies, first 4 weeks of year, annual rate	10.5	11.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Feb. 1, 1936, and Feb. 2, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 1, 1936, and Feb. 2, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb 1, 1936	Week ended Feb. 2, 1935	Week ended Feb 1, 1936	Week ended Feb 2, 1935	Week ended Feb. 1, 1936	Week ended Feb 2, 1935	Week ended Feb 1, 1936	Week ended Feb. 2, 1935
New England States:								
Maine	4	2	1	1	303	100	0	0
New Hampshire					34	3	0	0
Vermont					204	25	0	0
Massachusetts	11	5			513	360	3	1
Rhode Island	2	2			100	34	1	0
Connecticut	3	7	3	80	71	558	3	0
Middle Atlantic States:								
New York	39	49	[1] 17	[1] 28	1,166	1,091	20	5
New Jersey	8	15	10	35	55	156	4	3
Pennsylvania	51	36			643	2,126	2	6
East North Central States.								
Ohio	31	77	122	324	150	775	15	12
Indiana	29	41	28	125	17	383	1	0
Illinois	70	46	23	146	35	2,020	13	9
Michigan	10	7	2	61	59	403	2	1
Wisconsin	2	6	51	539	124	965	1	3
West North Central States:								
Minnesota	3	4	1	3	151	2,222	4	1
Iowa	11	11	2	61	9	1,132	2	2
Missouri	17	39	181	463	24	408	7	13
North Dakota	4	1	4	31	1	83	0	0
South Dakota	3	2			31		0	1
Nebraska	3	11		20	25	274	0	5
Kansas	11	8	29	48	18	981	1	1
South Atlantic States:								
Delaware	2	1			92	2	0	0
Maryland [2 3]	7	7	42	323	149	48	13	0
District of Columbia	19	7	4	4	6	7	4	6
Virginia	34	22			66	657	4	11
West Virginia	21	12	279	289	5	359	8	1
North Carolina	24	5	36	363	17	750	3	3
South Carolina	17	11	572	1,176	10	40	8	0
Georgia [3]	13	8	259	581			3	0
Florida	8	12	5	47		27	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 1, 1936 and Feb. 2, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 1, 1936	Week ended Feb. 2, 1935	Week ended Feb. 1, 1936	Week ended Feb. 2, 1935	Week ended Feb. 1, 1936	Week ended Feb. 2, 1935	Week ended Feb. 1, 1936	Week ended Feb. 2, 1935
East South Central States:								
Kentucky	22	27	62	195	60	384	13	4
Tennessee	14	17	124	396	13	25	7	12
Alabama [3]	15	9	301	1,380	33	217	0	3
Mississippi [2] [3]	5	7	--------	--------	--------	--------	1	0
West South Central States:								
Arkansas	3	5	50	148	2	14	2	4
Louisiana	20	36	10	24	37	279	0	1
Oklahoma [4]	9	17	198	263	1	69	15	1
Texas [3]	60	68	209	744	70	155	11	3
Mountain States:								
Montana	2	--------	26	565	39	107	1	3
Idaho	1	--------	4	7	31	29	0	1
Wyoming	--------	--------	--------	--------	3	65	0	2
Colorado	11	10	--------	--------	7	1,016	1	1
New Mexico	9	5	3	654	7	50	3	0
Arizona	--------	2	125	250	9	17	1	0
Utah [2]	2	2	--------	2	--------	5	0	1
Pacific States:								
Washington	5	1	--------	20	193	146	0	1
Oregon	3	1	29	291	540	82	0	1
California	46	56	131	565	1,228	267	5	3
Total	684	717	3,025	10,252	6,351	19,031	178	127
First 5 weeks of year	3,685	4,102	12,926	44,662	25,152	73,738	846	435

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 1, 1936	Week ended Feb. 2, 1935	Week ended Feb. 1, 1936	Week ended Feb. 2, 1935	Week ended Feb. 1, 1936	Week ended Feb. 2, 1935	Week ended Feb. 1, 1936	Week ended Feb. 2, 1935
New England States:								
Maine	0	0	19	18	0	0	1	1
New Hampshire	0	0	9	18	0	0	0	0
Vermont	0	0	21	25	1	0	0	0
Massachusetts	1	0	228	183	0	0	3	2
Rhode Island	0	0	13	15	0	0	0	0
Connecticut	0	0	56	46	0	0	0	0
Middle Atlantic States:								
New York	1	0	740	698	0	0	5	9
New Jersey	2	0	244	181	0	0	2	9
Pennsylvania	0	1	490	536	0	0	6	9
East North Central States:								
Ohio	0	1	472	927	2	1	4	1
Indiana	1	1	229	276	3	4	2	1
Illinois	0	1	684	918	6	4	2	6
Michigan	0	0	810	330	0	0	1	3
Wisconsin	1	0	473	606	5	18	2	5
West North Central States:								
Minnesota	1	0	374	129	9	4	1	2
Iowa	1	0	186	71	10	0	4	2
Missouri	0	0	168	70	3	1	3	4
North Dakota	0	0	96	75	7	0	0	0
South Dakota	0	0	72	12	16	2	0	0
Nebraska	0	0	139	63	45	49	2	0
Kansas	1	0	269	131	11	9	2	3
South Atlantic States:								
Delaware	0	0	8	16	0	0	0	0
Maryland [2] [3]	0	1	82	116	0	1	3	0
District of Columbia	0	1	16	22	0	0	1	1
Virginia	0	0	40	46	0	1	13	6
West Virginia	0	0	37	133	0	0	2	2
North Carolina [5]	1	2	32	31	1	0	2	2
South Carolina	1	0	5	8	0	0	0	2
Georgia [3]	0	0	24	13	0	0	2	4
Florida	0	0	13	5	0	0	0	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 1, 1936 and Feb. 2, 1935—Continued

Division and State	Poliomyelitis, Week ended Feb 1, 1936	Poliomyelitis, Week ended Feb. 2, 1935	Scarlet fever, Week ended Feb. 1, 1936	Scarlet fever, Week ended Feb. 2, 1935	Smallpox, Week ended Feb 1, 1936	Smallpox, Week ended Feb. 2, 1935	Typhoid fever, Week ended Feb 1, 1936	Typhoid fever, Week ended Feb 2, 1935
East South Central States:								
Kentucky	1	0	71	86	0	0	0	2
Tennessee	0	0	44	28	0	0	4	3
Alabama [3]	1	0	24	19	0	1	3	4
Mississippi [2] [3]	0	1	17	22	0	1	0	2
West South Central States:								
Arkansas	0	0	5	9	4	0	1	0
Louisiana	0	0	17	16	2	3	3	8
Oklahoma [4]	0	0	36	17	0	0	5	1
Texas [3]	0	2	115	[illegible]	1	7	5	17
Mountain States:								
Montana	0	0	120	64	9	3	1	1
Idaho	1	0	60	10	0	0	0	0
Wyoming	0	0	131	34	0	11	0	0
Colorado	0	0	213	283	1	5	0	1
New Mexico	0	0	63	34	1	0	1	3
Arizona	0	0	36	23	0	0	0	0
Utah [2]	0	0	72	[illegible]	0	0	0	0
Pacific States.								
Washington	1	1	127	53	12	80	3	4
Oregon	0	0	38	16	2	8	1	0
California	0	13	397	291	10	0	9	3
Total	15	26	7,113	6,[illegible]	162	201	111	127
First 5 weeks of year	94	143	35,771	31,101	1,026	[illegible]	545	756

[1] New York City only

[2] Week ended earlier than Saturday

[3] Typhus fever, week ended Feb 1, 1936, 9 cases, as follows: Maryland, 1, Georgia, 1, Alabama, 1; Mississippi, 1, Texas, 5.

[4] Exclusive of Oklahoma City and Tulsa.

[5] 1 case of smallpox reported in North Carolina during the week ended Jan. 11, 1936, later proved not to be a case of smallpox.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November 1935										
Puerto Rico	--------	80	134	1,[illegible]	28	5	2	3	0	72
December 1935										
Montana	1	15	106	1	80	--------	0	672	140	3
Nevada	4	1	12	--------	15	--------	1	28	0	0
North Dakota	1	9	23	--------	30	--------	0	164	5	6
Virginia	16	251	555	4	164	6	3	225	0	21
Washington	10	2	40	--------	[illegible]	--------	4	335	[illegible]	12

See footnotes at end of table

November 1935

	Cases
Puerto Rico:	
Chicken pox	12
Dysentery	13
Filariasis	5
Leprosy	2
Mumps	28
Ophthalmia neonatorum	4
Puerperal septicemia	3
Tetanus	9
Tetanus, infantile	9
Trachoma	2
Whooping cough	135
Yaws	1

December 1935

	Cases
Actinomycosis:	
Montana	1
Botulism:	
Montana	2
Washington	1
Chicken pox:	
Montana	213
Nevada	5
North Dakota	91
Virginia	397
Washington	453

December 1935—Continued

	Cases
Dysentery:	
Virginia (bacillary)	21
Washington (amoebic)	1
Washington (bacillary)	5
Epidemic encephalitis:	
North Dakota	1
Virginia	1
Washington	3
German measles:	
Montana	5
Washington	121
Impetigo contagiosa:	
Washington	1
Mumps:	
Montana	1,083
Nevada	32
North Dakota	469
Virginia	100
Washington	416
Paratyphoid fever:	
Virginia	2
Puerperal septicemia:	
Washington	3
Rabies in animals:	
Washington	4
Rocky Mountain spotted fever:	
Virginia	2

December 1935—Continued

	Cases
Septic sore throat:	
Montana	18
North Dakota	1
Virginia	4
Tetanus:	
Montana	2
Virginia	1
Trachoma:	
Montana	1
Washington	37
Tularaemia:	
Virginia	27
Undulant fever:	
Montana	1
Virginia	2
Washington	5
Vincent's infection:	
North Dakota	2
Washington	4
Whooping cough:	
Montana	71
North Dakota	3
Virginia	79
Washington	63

WEEKLY REPORTS FROM CITIES

City reports for week ended Jan. 25, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	1	1	0	5	1	0	0	0	6	20
New Hampshire:											
Concord	0		0	0	1	1	0	0	0	1	7
Manchester	0		1	0	0	2	0	0	0	0	13
Nashua	2			0		1	0		0	0	
Vermont:											
Barre											
Burlington	0		0	2	0	0	0	0	0	0	5
Rutland	0		0	4	2	3	0	0	0	2	10
Massachusetts:											
Boston	2		1	73	31	78	0	7	0	8	247
Fall River	0		0	0	5	8	0	2	0	1	37
Springfield	0		0	0	4	5	0	1	0	17	41
Worcester	0		0	0	12	19	0	4	0	2	57
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	23
Providence	0		0	13	11	7	0	0	0	7	69
Connecticut:											
Bridgeport	0	1	0	0	11	1	0	1	0	3	34
Hartford	0		0	2	6	2	0	1	0	3	53
New Haven	0	2	1	1	2	3	0	1	0	28	42
New York:											
Buffalo	2		0	14	18	63	0	7	0	12	181
New York	40	21	3	278	170	305	0	84	6	70	1,557
Rochester	0		0	0	7	6	0	3	1	2	85
Syracuse	0		0	24	3	22	0	0	0	34	45
New Jersey:											
Camden	0		0	0	0	1	0	0	0	0	22
Newark	0	2	1	3	6	75	0	8	0	20	111
Trenton	0		1	1	4	8	0	3	0	4	28
Pennsylvania:											
Philadelphia	7	4	0	244	30	116	0	28	2	78	495
Pittsburgh	7	6	0	33	33	90	0	3	0	17	176
Reading	0		0	2	0	6	0	0	0	1	28
Scranton	0			16		6	0		0	0	

City reports for week ended Jan. 25, 1930—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Ohio:											
Cincinnati	3		2	0	16	21	0	11	0	3	138
Cleveland	3	21	0	36	27	50	0	12	0	48	184
Columbus	2		0	0	5	32	0	2	0	5	86
Toledo	1	2	3	14	5	5	0	3	0	4	53
Indiana:											
Anderson	0		0	0	5	0	2	1	0	4	11
Fort Wayne	3		0	1	2	11	0	0	0	0	24
Indianapolis	3		0	2	26	22	0	4	0	16	109
Muncie	1		0	0	1	0	0	0	0	0	11
South Bend	0		0	0	1	1	0	0	0	4	17
Terre Haute											
Illinois:											
Alton	0		0	0	0	4	0	0	0	0	7
Chicago	19	9	3	9	53	200	0	38	1	147	700
Elgin	0		0	0	0	3	0	0	0	0	11
Moline	2	1	0	0	4	4	0	0	0	0	16
Springfield	1		0	0	5	6	0	0	0	0	27
Michigan:											
Detroit	16	2	1	5	48	91	0	19	1	186	275
Flint	2		0	0	4	20	0	1	0	8	19
Grand Rapids	0		0	2	2	11	0	0	0	3	35
Wisconsin:											
Kenosha	0		0	1	0	4	0	0	0	7	9
Milwaukee	1	4	4	4	8	83	0	4	1	68	109
Racine	0		0	1	0	28	0	0	0	3	
Superior	0		0	0	0	2	0	0	0	0	6
Minnesota:											
Duluth	0		0	0	2	11	1	0	0	3	18
Minneapolis	0		0	35	6	117	0	1	[illegible]	1	114
St. Paul	0		0	25	5	37	0	1	0	4	57
Iowa:											
Cedar Rapids	0			0		2	0		0	0	
Davenport	1			0		18	0		0	0	
Des Moines	3			0		4	0		0	0	41
Sioux City	0			2		3	8		0	0	
Waterloo	2			0		1	0		0	1	
Missouri:											
Kansas City	3		1	0	30	19	0	4	0	0	122
St. Joseph	4		0	6	3	2	1	1	0	1	28
St. Louis	15	4	0	1	17	71	0	8	0	1	236
North Dakota:											
Fargo	1		0	1	0	3	0	1	0	0	8
Grand Forks	0			1		0	0		0	0	
Minot	0		0	0	0	10	0	0	0	0	3
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0		0	0	0	22	1	0	0	0	
Nebraska:											
Omaha	1		0	4	5	71	3	0	0	0	68
Kansas:											
Lawrence	0		0	0	0	0	0	0	0	0	4
Topeka											
Wichita	3		0	1	2	15	0	0	0	1	32
Delaware:											
Wilmington	0		0	0	4	2	0	1	0	6	26
Maryland:											
Baltimore	1		3	16	24	38	0	15	1	21	241
Cumberland	0		0	0	1	2	0	0	0	0	11
Frederick	0		0	0	0	2	0	0	0	0	1
District of Col.:											
Washington	21	4	3	9	18	19	0	12	0	2	184
Virginia:											
Lynchburg	2		0	2	4	4	0	2	0	3	18
Norfolk	2		1	1	10	0	0	1	0	6	35
Richmond	1		1	0	7	6	0	4	0	6	70
Roanoke	5		1	0	1	1	0	0	0	0	28
West Virginia:											
Charleston	1	2	2	0	4	0	0	1	0	0	28
Huntington	0			0		2	0		0	0	
Wheeling	0		1	0	2	0	0	5	0	0	19

City reports for week ended Jan. 25, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
North Carolina:											
Gastonia	0	------	0	0	1	0	0	0	0	0	7
Raleigh	0	------	0	0	2	0	0	2	0	1	11
Wilmington	0	------	0	0	3	1	0	0	0	0	18
Winston-Salem	0	1	1	9	6	3	0	1	0	0	17
South Carolina:											
Charleston	0	58	3	0	3	4	0	2	1	0	25
Columbia	------	------	------	------	------	------	------	------	------	------	------
Greenville	0	------	0	27	1	0	0	0	1	0	8
Georgia:											
Atlanta	6	18	2	0	12	15	0	3	0	0	89
Brunswick	0	------	0	0	2	0	0	0	0	0	6
Savannah	2	19	2	0	2	6	0	3	1	0	33
Florida:											
Miami	2	1	0	2	3	4	0	1	0	1	30
Tampa	0	------	0	0	2	6	0	2	0	0	30
Kentucky:											
Ashland	0	------	------	0	------	0	0	------	0	1	------
Covington	0	------	0	0	3	4	0	2	0	1	25
Lexington	0	------	0	0	12	2	0	2	0	0	21
Tennessee:											
Memphis	1	------	2	0	13	10	0	3	1	2	94
Nashville	2	------	2	0	2	3	0	5	0	0	77
Alabama:											
Birmingham	1	8	0	0	11	3	0	8	0	0	75
Mobile	4	3	2	0	1	0	0	0	0	0	23
Montgomery	1	2	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	1	------	------	0	------	1	0	------	1	0	------
Little Rock	1	------	0	0	4	5	0	0	0	0	5
Louisiana:											
Lake Charles	0	------	0	0	8	0	0	0	0	0	8
New Orleans	10	3	2	12	12	13	0	14	0	20	184
Shreveport	------	------	------	------	------	------	------	------	------	------	------
Texas:											
Dallas	7	2	2	0	6	3	0	0	0	1	65
Fort Worth	1	------	0	0	6	12	0	0	0	0	61
Galveston	1	------	0	0	2	1	0	1	0	0	10
Houston	13	------	1	4	11	4	1	7	0	0	94
San Antonio	3	------	3	0	8	4	0	4	0	1	73
Montana:											
Billings	0	------	0	1	1	16	0	1	0	2	16
Great Falls	0	------	0	0	0	4	0	0	0	5	8
Helena	------	------	------	------	------	------	------	------	------	------	------
Missoula	0	------	0	0	3	20	1	0	0	0	10
Idaho:											
Boise	0	------	0	0	2	3	0	0	0	0	10
Colorado:											
Colorado Springs	0	------	------	3	1	11	0	1	0	2	11
Denver	2	------	5	6	14	20	0	3	0	12	96
Pueblo	0	------	0	0	1	43	0	0	0	0	9
New Mexico:											
Albuquerque	0	------	0	1	4	6	0	3	0	0	30
Utah:											
Salt Lake City	0	------	0	2	6	51	0	0	1	8	31
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	2	19	11	32	2	3	0	7	99
Spokane	0	2	2	6	4	12	0	1	0	3	34
Tacoma	0	------	0	0	0	2	0	0	0	0	30
Oregon:											
Portland	0	1	0	198	8	9	0	0	0	0	89
Salem	0	------	------	0	------	2	0	------	0	0	------
California:											
Los Angeles	15	28	0	147	30	73	0	12	1	13	284
Sacramento	4	2	1	9	3	21	0	2	0	2	31
San Francisco	0	14	0	138	12	38	0	12	0	9	204

City reports for week ended Jan. 25, 1936—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Vermont:			
Rutland	1	0	0
Massachusetts:			
Boston	2	1	1
Worcester	1	1	0
Connecticut:			
New Haven	1	0	0
New York:			
Buffalo	1	0	0
New York	19	5	0
Ohio:			
Cincinnati	3	1	0
Cleveland	3	0	0
Columbus	2	1	0
Indiana:			
Indianapolis	1	1	0
Illinois:			
Chicago	6	2	0
Michigan:			
Detroit	2	1	0
Wisconsin:			
Milwaukee	1	0	0
Minnesota:			
Minneapolis	1	0	0
Missouri:			
St. Joseph	1	1	0
St. Louis	2	1	0
Maryland:			
Baltimore	9	1	0
District of Columbia:			
Washington	3	2	0
South Carolina:			
Charleston	1	0	0
Georgia:			
Atlanta	2	0	0
Tennessee:			
Memphis	0	2	0
Nashville	3	0	0
Alabama:			
Birmingham	1	0	0
Texas:			
Fort Worth	1	0	0
Galveston	1	0	0
Houston	3	1	0
Oregon:			
Portland	1	0	0
California.			
Los Angeles	1	0	0
San Francisco	1	0	1

Epidemic encephalitis.—Cases: Newark, 1; Cleveland, 1; Columbus, 1; Birmingham, 1; San Francisco, 1.
Pellagra.—Cases: Charleston, S. C., 1; Savannah, 3; New Orleans, 1; Dallas, 2; Los Angeles, 1.
Typhus fever.—Birmingham, 1; Mobile, 1.

CUBA

Provinces—Notifiable diseases—4 weeks ended January 11, 1936.—During the 4 weeks ended January 11, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1		3	6			10
Chicken pox		4	4	7		2	17
Diphtheria		1	1	2	1	1	6
Hookworm disease				1		52	53
Leprosy				1	7	11	19
Malaria	150	93	519	746	899	1,087	3,494
Measles						2	2
Poliomyelitis		1	1	2		2	6
Tuberculosis	5	60	36	22	33	36	192
Typhoid fever	4	41	3	34	40	66	188

CZECHOSLOVAKIA

Communicable diseases—November 1935.—During the month of November 1935, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	1		Paratyphoid fever	22	1
Cerebrospinal meningitis	6	3	Poliomyelitis	11	2
Chicken pox	417		Puerperal fever	41	19
Diphtheria	3,373	186	Scarlet fever	3,727	36
Dysentery	267	55	Trachoma	91	
Influenza	70	5	Typhoid fever	627	65
Lethargic encephalitis	1	1	Typhus fever	4	2
Malaria	51				

IRISH FREE STATE

Vital statistics—Third quarter, 1935.—The following statistics for the Irish Free State for the quarter ended September 30, 1935, are taken from the Quarterly Return of Marriages, Births, and Deaths issued by the Registrar General, and are provisional:

	Number	Rates per 1,000 population		Number	Rates per 1,000 population
Population	3,033,000		Diphtheria	59	
Marriages	4,664	4.40	Dysentery	1	
Births	14,941	19.70	Influenza	119	.16
Total deaths	8,791	11.60	Measles	27	
Deaths under 1 year of age	933	(1)	Puerperal sepsis	11	(2).74
Deaths from:			Scarlet fever	15	
Cancer	856	1.13	Tuberculosis (all forms)	[illegible]	1.11
Diarrhea and enteritis (under 2 years)	267		Typhoid fever	13	
			Whooping cough	25	

[1] Deaths under 1 year per 1,000 births, 62. [2] Per 1,000 births

JAMAICA

Communicable diseases—4 weeks ended January 25, 1936.—During the 4 weeks ended January 25, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox	4	15	Puerperal fever		1
Diphtheria		1	Scarlet fever		1
Dysentery	10	6	Tuberculosis	[illegible]	89
Erysipelas		1	Typhoid fever	[illegible]	112
Leprosy	1				

VIRGIN ISLANDS

Notifiable diseases—October–December 1935.—During the months of October, November, and December 1935, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	October	November	December	Disease	October	November	December
Chicken pox		1		Mumps	[illegible]		1
Dengue		53	5	Pellagra		1	
Filariasis	3	7	6	Syphilis	11	[illegible]	5
Gonorrhea	11	6	4	Tuberculosis		3	1
Malaria			1	Uncinariasis	9	4	
Measles			1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for January 31, 1936, pages 122–137. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued February 28, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Indochina—Saigon-Cholon.—According to information dated January 29, 1936, some Chinese women residing outside of the port area of Saigon-Cholon, Indochina, were reported dead from plague January 16, 1936. No further cases were reported and rats caught in the vicinity showed no traces of plague.

Yellow Fever

Brazil—Sao Paulo State.—Yellow fever has been reported in Sao Paulo State, Brazil, as follows: January 13, 1936, 1 case and 1 death at Araraquara; January 14–15, 1936, 2 cases and 2 deaths at Aracatuba.

Senegal—Casamance—Kolda.—On January 29, 1936, 1 case of yellow fever was reported at Kolda, Casamance, Senegal.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

W. F. DRAPER, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

Requests for and communications regarding the PUBLIC HEALTH REPORTS, reprints, or supplements should be addressed to the Surgeon General, United States Public Health Service, Washington, D. C. Subscribers should remit direct to the Superintendent of Documents, Washington, D. C.

Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

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THE PLACE OF MENTAL HYGIENE IN A FEDERAL HEALTH PROGRAM[1]

By WALTER L. TREADWAY, *Assistant Surgeon General, United States Public Health Service*

In discussing the place of mental hygiene in a Federal health program it is well to consider the subject from the viewpoint of its professional content, and to clarify, perhaps, the relationship such content may bear to practical and abiding results. Brief mention will therefore be made of the material with which mental hygiene is expected to deal.

For many years, the term "mental hygiene" was limited largely in application to what today are classified as the psychoses, the behavior of such patients leading to legal commitment and compulsory segregation for the protection of both the patient and the community. It is this step that is implied by the word "insanity", a term that has no other meaning in medical terminology. In addition to the psychoses, it is now recognized that there is an even larger field of mental illness in which the question of compulsory segregation of the patient or that of insanity does not arise. This group comprises what is known as the "psychoneuroses." Its size and importance as a cause of invalidism and as a problem in national health can best be gaged from the fact that approximately 4 in every 10 persons applying for medical advice in public clinics and dispensaries are invalided because of mental illness of this type. Moreover, it is also recognized that physical disease often has a psychic or mental component associated with it.

The psychoses and psychoneuroses do not complete the total disorders with which mental hygiene is called upon to deal. To them must be added mental deficiency, or feeblemindedness, as it is more often called, and also a variable proportion of behavior problems now included under the headings of dependency, delinquency, and crime. But there is still an additional group of large size, consisting of behavior problems of children and of older persons not ordinarily included with the psychoneuroses, but which are the outcome of faulty habits and misunderstandings in dealing with environmental relationships. Such behavior problems, if uncorrected, may be the forerunners of

[1] Presented in summary at the session on mental hygiene, American Public Health Association, Milwaukee, Wis., Oct. 7, 1935.

crystallized faulty mental adjustments in later life or adaptations that are contrary to customary behavior prescribed by society.

There are many who believe that "mental hygiene" has reached that stage in its development when it is desirable to resurvey its fundamental values and also the security of the foundations upon which it rests. Such a survey may be approached through six broad avenues of interest, including, first, that concerned with the recognition and with the early and adequate treatment of the mentally ill; second, with investigations into the nature and underlying causes of such illness; third, with the training of personnel for undertaking the duties involved in this particular field; fourth, with the adoption of measures to render less threatening a possible increase in the number of the mentally ill; fifth, with a more satisfactory solution of the economic problems associated with mental illness; and, sixth, with measures for uprooting community sources of mental invalidism, disease, and defect.

THE PROBLEM OF ADEQUATE TREATMENT FOR THE MENTALLY ILL

In approaching the task of evaluating the adequacy of facilities for the treatment of the mentally ill of a given community or of a political jurisdiction, it must be appreciated, first, that any betterment in the social organization and moral obligations of a self-governing people does not spring from the mind of any one person, but evolves from the congregate opinions and wishes of generations in community groups. Most changes in these fields have been based upon a framework of tradition and community principles. These have been flavored, perhaps, by a dash of the spirit of the times, which enthusiastically awakened a public consciousness through emphasizing the humane aspects of a particular social situation. This awakening of public consciousness has ofttimes either not been aware of, or has not taken into account the basic need for, accurate and scientific knowledge in meeting various phases of the problems involved.

For example, in London, where, about the middle of the sixteenth century, the first abiding steps were taken to meet the situation affecting public relief, those seeking aid were divided into three broad groups: First, were the poor children, provided for at Christ's Hospital, a policy that has served to influence a traditional background toward the evolution of all those diversified and by no means uniform public policies for the welfare of children; second, were the sick and helpless persons, provided for at St. Thomas' Hospital, or given a license to beg, that early policy traditionally influencing those later and varied policies toward that particular group of the population; and third, were the sturdy and able-bodied vagabonds, who were gathered together at Bridewell, and for whom occupations were provided, and the "insane", who were cared for at Bethlehem Hospital.

The latter for a time was considered as a separate institution, but its separate administration existed for a short time only, as early reports show that Bridewell and Bethlehem Hospitals were administered by the same group of persons. The influence of these early policies, especially toward the "criminal" and the "insane", still bears its mark upon public outlook, since these principles, adopted in the Old World, followed the colonists to America as part of their social philosophy.

Early progress in this country in the matter of attempting to meet the needs of special groups who constituted special social problems, was stimulated by philanthropies or by appeals to the humane instincts, without recourse to special knowledge of the particular problem involved. With the march of time, however, much has been accomplished for "the child", for "the sick", for "the poor" and for "the bad." History has clearly shown, however, that wherever there are groups of "children", "physically sick persons", "bad men and women" or "poor people", there one finds degrees of mental ill health demanding attention and disproportionate to that of an average general population. Moreover, every policy that has been set up to deal with these particular situations has been complicated by a mental health administration problem which is not being met in a logical or uniform manner. The accessibility of these particular groups of the population for study and investigation makes possible the establishment of a more or less accurate endemic index of mental ill health, leading eventually to a mental health administration policy based upon where and when such illness occurs.

It is true that public sentiment toward these groups of the population has become more charitable with the passage of time; nevertheless, there is a paradoxical attitude of "public mind" toward them, fluctuating between sentimental sympathy on the one hand and condemnation on the other hand.

This paradox is further illustrated by the fact that, for the first time in history, a wider interest is now being shown in disorders of the mind by the lay public; failures and unconventional behavior and conduct are being interpreted, not in terms of institutional provisions, but in terms of personality factors having behind them mental implications. Moreover, workers in the mental health fields are being called upon for a greater and greater responsibility and function to the community. Home, school, and other relationship problems are being referred; demands are being made by educational and health services, by industry, by general hospitals, by vocational and child guidance agencies, and by courts and penal and correctional institutions and those ministering to dependency, for services that demand an organized and concerted public policy to meet the needs of the mentally ill.

On the other hand, this demand for wider service is inconsistent with the facilities and means now available for the early recognition, amelioration, treatment, and care of adverse mental states, or for relieving persons in the incipient stages of mental ill health. Rapid growths in population, coupled with the necessity for securing immediate institutional provisions for those making the strongest appeal, have resulted in the development of piecemeal facilities and policies, without regard to an adequately balanced program. Such piecemeal growths have met some of the community's needs and left other, and perhaps equally important, needs unprovided for. In consequence, every stage in the evolution of public facilities and public policies for the mentally ill may be found somewhere represented in the United States today.

The recognition, treatment, and care of mental illness implies a knowledge of these diseases; and whereas the present status of medical knowledge makes possible the interpretations of departures in social adaptations and adjustments, not in terms of institutional facilities alone but in terms of individual needs and requirements, that knowledge does not always enter into the formulation or administration of public policies toward the mentally ill of American communities.

As an illustration of the potential needs in this field, it is sufficient to point out that only a very few States or local jurisdictions have seen fit to place their mental health administrative problems under the immediate banner and guidance of persons with medical training. In fact, in the majority of instances where central administrative control agencies have been established, the executive functions in mental health administration have been assumed largely by lay representatives, without regard for the executive and administrative functions which modern medicine may or can assume. While it is true that no State legislature has kept pace with the needs of the mentally ill, nevertheless in those States where mental health administration is directed by medically trained persons, the facilities and public policies for that group of the population stand far ahead of those jurisdictions where domiciliary facilities alone represent the assumed total of a community's obligation and responsibility toward mental disease and disorders.

Mental health administration in the United States is comparable to that of public health administration of 80 years ago. It is apparent also that the effectual fulfillment of any mental health administration program for a given community or political jurisdiction involves the development of a department, a division, or a special agency charged specifically with carrying it into effect, and the appointment of a competent, reliable, and experienced physician, with such necessary deputies and assistants as may be required, for the responsible execution of the aims and objectives of such a program.

The content and execution of a mental health administration program embraces the formulation of policies respecting the qualifications and training of medical and technical personnel, both special and general, that are required to meet the problems of mental illness; the enforcement of regulations governing the qualifications and appointment of medical commissions for the detection and certification of mental diseases and defects; those governing the operation of community facilities for the early diagnosis, treatment, and care of persons with mental diseases or mental defects, and for inebriates and problem children; those governing the rendering of expert testimony in alleged mental cases; those governing the mental examination of offenders against the law and the disposition of mentally disordered and mentally defective delinquents; those governing the formulation and supervision of measures and policies concerned with the treatment, care, disposition, and general supervision of mentally disordered members of the population, including regulations governing a system of interchange of mental patients with jurisdictions having responsibility for their care; with the development and supervision of facilities and agencies for out-patient and in-patient treatment when needed; and the community supervision of mentally disordered persons when necessary, including the insane, the mentally defective, the epileptic, and problem situations manifesting symptoms of mental ill health; and last, but not least, with taking stock of the material with which mental health administration is called upon to deal, so that comparisons may be made from time to time of the conditions under which mental diseases are found and when they occur, and including an analysis of the omissions and commissions attributed to a given public policy.

The time has arrived when a national health agency must take cognizance of the need for greater uniformity in mental health administration. It is evident that an agency such as the United States Public Health Service must eventually assume a more permanent and active role in this particular field by serving as a depository for the collection and dissemination of information on matters pertaining to mental health administration, by making studies and investigations of the prevalence and needs of the mentally ill, and by making available to the States and political subdivisions thereof a consultant service, to the end that more adequate facilities and uniform measures may be adopted for the early recognition and treatment of mental ill health.

On the other hand, an analysis of the activities of the Federal Government in the field of mental health administration shows a lack of uniformity in the evolution of policies or facilities hardly comparable with that of local governments where greater unity of local opinions and customs in these matters is more likely to crystallize

into law or regulation. Of the 10 executive departments of the Federal Government, 8 have functions directly and intimately concerned with the problem of mental disease and mental disorders. Several independent establishments also have similar interests. It must be appreciated, however, that the Federal Government, as a whole, involves an intricate maze of activities and interests. Lack of uniformity in the field of mental health administration as it affects the wards and beneficiaries of the Federal Government is but a part of this intricate maze; and since there are but a few to champion the rights of these mentally ill, medical and scientific opinion concerning these matters has sometimes been subservient to expediency. There is need, however, for better coordination and greater uniformity in administrative policies respecting these matters as they affect the various departments of the Federal Government. The Public Health Service may serve as the coordinating medical agency to bring about greater uniformity in this particular governmental activity.

THE NATURE AND CAUSES OF MENTAL ILLNESS

In many instances the exact nature of certain forms of mental illness is unknown, their exact cause is often vaguely understood, and definite knowledge as to where, when, and under what conditions they occur leaves much to be desired. This also holds true for many physical diseases, however.

Nevertheless, the exact nature of certain types of mental diseases or disorders is known, and their causes, conditions under which they arise, and their treatment or amelioration are fairly well understood. General paralysis of the insane is one example of the latter situation. The amount of work and study necessary to bring the knowledge of this disease to its present state represents diligent application and study of a widely diversified professional group, extending over a period of a little more than 130 years.

The present knowledge of the nature of mental diseases, despite its shortcomings, is based upon a background of scientific inquiry and traditional attack under the banner of medicine. If one believes that the behavior and conduct of an individual and the adjustment of his body to his environment are all intricately bound up with that complicated maze of neurological function which associates, correlates, and synchronizes the various activities of the organs of the body and of the conscious mental life, then psychobiology and mental health must enter into every aspect of human activity.

This broad conception of the scope of mental hygiene or mental health at once becomes a challenge for all those interests and activities embraced by the field of human relationships. A determination of the more exact nature and causes of mental diseases is a special challenge to medicine and biology; whereas the conservation of men-

tal health and the prevention of mental illness are not only a special challenge to medicine and biology, but are also a particular challenge to statesmanship and the legal profession, and to sociology and education in their broader aspects.

It is apparent that a comprehensive national health program must take into account the need for research and investigation into the nature and causes of mental ill health, and a more accurate determination of where, when, and under what conditions such diseases arise. The United States Public Health Service, because of its access to clinical material, it being charged by law with the care and treatment of a widely diversified group of beneficiaries or wards of the Government; and because of its wide scope of interests and activities in the field of biologic research, it is potentially fitted as a nuclear agency for carrying on studies of this character.

There is nothing new in such a proposal, since whole-time research supported by public funds in terms of careers is already effective. Moreover, there is no danger that, through supported medical research by public funds, universities or even privately endowed agencies will lose the particular kind of scientific leadership and power of inspiration which it is essential they retain. Owing to their very nature, universities and privately endowed foundations can offer only limited opportunities in scientific research to the ablest and most enterprising students and workers. Furthermore, the more numerous the extra-academic and stabilized opportunities in the field of research, the greater will be the number of able men and women willing to try for careers of distinction, for the promotion of science for science's sake, and for a patriotic service to their country.

The scientific future of any country or organization cannot be determined alone by the attractiveness of formal teaching, but must afford the best and more promising young workers, since they represent the seeding of the scientific world, an opportunity for a living contact with the highest type of ability and research achievement. The Public Health Service may offer opportunities to men and women, selected for their achievement and promise, for sharing in the responsibility for the scientific future of public and mental health; for fundamental advances toward a better understanding of the nature and causes of certain types of ill health; and for paving the way for applying the results of such research studies to the definite objective of preventing specific illnesses or disease.

In approaching the subject of research into the nature and causes of mental diseases and disorders, it must be appreciated that man is a biological complex, synchronized and functioning as a unit, and that the sum total of scientific knowledge concerning man has progressed with amazing rapidity. The knowledge of the nature and causes of ill health, to say naught of treatment, have been revolutionized in the

past generation. One need but mention the advances made in the realm of comparative anatomy, in neuro-physiology, in biochemistry, in biophysics, in endocrinology, immunology and allergy, and the psychobiologic component of ill health to appreciate the need for correlating research in the basic medical sciences and the social sciences with a comprehensive program of mental health.

There are men well qualified to direct and conduct certain specific research projects, whose happiness and efficiency in research are contingent upon the associations of an academic life. It is desirable, therefore, in the interest of advancing the sum total of knowledge, to utilize those facilities available in American universities to the fullest extent possible by grants in aid to those who, through achievement, are able to carry on definite research projects. Such grants, however, should be coordinated with the various problems relating to the nature and causes of mental ill health, and to where, when, and under what conditions mental diseases and disorders occur. Corollary to such a proposal is the granting of fellowships to those qualified to undertake research projects of this nature under the general provisions establishing the National Institute of Health of the Public Health Service.

It is apparent that some agency must eventually correlate and evaluate research projects being undertaken in this particular field in order that those engaged therein may be in a better position to concentrate their efforts in directions best suited to accomplish results. A national health agency may justifiably not only assume the conduct of research studies in the field of mental health as they relate to the application of preventive measures and the promotion of positive good mental health, but it may serve also as a depository for the collection and dissemination of information on various research projects undertaken by various other agencies, and act to stimulate such agencies for research in this particular field through its correlating and coordinating efforts.

TRAINING OF PERSONNEL

The present cooperative endeavors for arranging a medical curriculum to meet eventual needs must be maintained between those, on the one hand, interested in problems affecting the health of the general public, and those, on the other hand, who are concerned with medical education. Similar endeavors are essential in relation to the curricula for the training of technical and other personnel whose tasks and interests relate to public and mental health.

Agencies interested in mental health should give endorsement to that immediate problem of the American Board of Psychiatry and Neurology, concerned with the establishment of minimum standards for qualifying specialists in these fields, so that the general public and other groups, such as those requiring trained personnel, may

possess guides for choosing specially trained people for those special tasks involved in a comprehensive mental health program.

A comprehensive mental health program, as it relates to the Federal Government, involves only indirectly the question of medical education, excepting insofar as the need arises for recruiting competently trained personnel or the training of such of its employees as may be required for carrying out the essential features of its particular work.

MEASURES FOR CONTROL

Measures necessary for the control of mental disease in an effort to minimize the threat of a possible increase, involve those applicable to an individual, on the one hand, and to the population mass, on the other hand. The first category may include such measures as birth control, human sterilization, institutional segregation, and community supervision, about which there are wide differences of opinion and no concerted or uniform policy. These measures demand further study and investigation before fundamental and scientific principles can be evolved and practical and uniform measures proposed.

The second category may include such measures as the control of foreign immigration and the interstate migration of mentally disordered persons. The first contribution of the Public Health Service to mental health had its inception in 1875, when, by a decision of the Supreme Court, all State laws relating to foreign immigration were declared unconstitutional and the authority for the regulation of foreign immigration was vested in the Federal Government. It was not until 1882, however, that the first Federal immigration law was enacted. Several changes have taken place in this law, a significant one in 1891, since which year the medical examination of arriving aliens has been conducted by the Public Health Service.

Our changing immigration policy inaugurated by the per centum limit plan of restriction provided in 1924 for a system of consular inspection of prospective immigrants in countries of origin. This was by no means a new proposal, for the first bill providing for such a scheme was introduced in Congress in 1838. Since 1925, however, a system has been applied, in connection with the application of immigration visas, for the Public Health Service medically to examine prospective immigrants in countries of their origin.

Throughout the more than 40 years' experience of the Service in immigration work sincere efforts have been made to bring about greater perfection in the recognition of mental defects and diseases among immigrants. The culmination of these efforts is reflected in part by the recent authorization for the establishment of more adequate facilities for the conduct of this phase of immigration work, notably a modern psychiatric pavilion at Ellis Island, N. Y.

THE ECONOMIC PROBLEM

To date there has been no very satisfactory solution of the economic problems associated with mental illness. This requires further study and investigation, with special reference to the adequacy of facilities and measures to meet the needs of the mentally ill of a given population.

There is evident need, however, for greater uniformity in the matter of interchanging mentally disordered persons between jurisdictions having responsibility for their care. It is possible that a national health agency may be of assistance in these matters by serving as a depository for the collection, correlation, and dissemination of information on the subject, to the end that a more satisfactory economic solution may be found.

UPROOTING COMMUNITY SOURCES OF MENTAL ILLNESS

It would hardly seem necessary to justify the responsibility for mental health or mental hygiene as belonging in the field of the medical profession. One obvious reason for this statement is that the diagnosis and recognition of the nature and causes of mental ill health are the foundations upon which the whole superstructure of mental health or mental hygiene must be built. The prevention of ill health and the promotion of positive health implies a knowledge of ill health. In the ultimate analysis, however, mental health is only an aspect of what is termed "public health."

As public health workers, your interest in the prevention of mental illness will carry you into the field of, first, those mental disorders or conditions associated with structural changes in the brain or conditions which interfere with its nutrition; second, those diseases or disorders associated with faulty mental adjustment, often classed as the "functional case" or psychogenic disorders; and, third, that group characterized by abnormal personal make-up. The time has arrived, however, when some agency such as that of the Public Health Service must undertake studies and investigations by practical demonstrations as to how our present knowledge of mental hygiene may be integrated with that of a regularly constituted local health organization. Those mental disorders involving exogeneous poisons and infections are mass phenomena of disease demanding mass control and the application of preventive measures embracing those broad public health policies of which mental hygiene is but a part. Reference may be made, also, to such situations as those involving alcohol, drugs, industrial hazards, venereal diseases, infections involving the central nervous system primarily, nutritional situations, child and maternal welfare, and other adult problems, all carrying with them a mental health factor that must be met eventually through the

regularly constituted health agency amplified in its organization and outlook to meet these special health factors.

Without going further into this interesting and important phase of a mental health program, it is desirable to point out that, during the course of this discussion a distinction has been implied between the prevention of ill health and the promotion of positive good health. These are not distinctly separate fields, but have been treated in this manner merely to give them emphasis. Medicine has the major responsibility in the prevention of illness and, through this function, should exert a direct influence on the promotion or conservation of good mental health. Perhaps a direct responsibility for the promotion of positive mental health rests in educators. Other groups are also concerned, including law, psychology, and sociology in its broadest aspects.

It is not possible to practice medicine satisfactorily today, whether it be remedial or preventive medicine, without realizing that man represents a component unit of organs and functions acted upon and reacting to conditions under which he lives. Much of the behavior of man, including many symptoms of ill health, is a direct reaction to his social environment. If physicians are to undertake full responsibilities, then it is essential that they take cognizance of the forces at work in their community. Mass study of such forces is a function peculiar to epidemiology and sociology. Problems being encountered by the modern demand made in the practice of preventive medicine are increasingly seeking for solution, an absorption of the methods and technique of sociology. Sociology and epidemiology, in their broadest sense, have some contributions to make for the promotion and conservation of mental health.

If it is true that the promotion of positive mental health is partly a matter of training and habits, then it is apparent that the responsibility of education in its broadest implication is of great importance. This statement carries greater significance when it is realized that education means far more than the acquisition of knowledge. The educator, including parents, should be concerned with the development of what is called normal habits, the term "normal" being used as indicating behavior bringing successful adaptation to social environments. The public health physician, correlating his interests with those of educators, is probably more concerned with avoiding and remedying abnormal habits. The interrelation between preventive medicine and education becomes at once apparent.

The mental health interests of a regularly constituted local health agency, therefore, leads to inquiries correlating with those of education methods and with measures for the correction of adverse situations in that particular field, with those of jurisprudence, and with those of a sociological and epidemiological character involving recreation, use of

leisure time, housing, working conditions, and many other questions of similar import affecting the social environment.

CONCLUSIONS

In closing this discussion on the place of mental hygiene in the Federal health program, reference may be made to the need for greater uniformity in mental health administration in the United States. This may be encouraged by a national health agency becoming a depository for the collection and dissemination of information upon matters pertaining to mental health administration, by making studies and investigations of the prevalence and needs of the mentally ill, and by making available to the States and political subdivisions thereof a consultant service, to the end that more adequate facilities and uniform measures may be adopted for the early recognition and treatment of mental ill health. There is need also for better coordination and greater uniformity in administrative policies respecting these matters as they affect the various departments of the Federal Government, and the Public Health Service may serve as the coordinating medical agency to bring about greater uniformity in this particular governmental activity.

Furthermore, a national health agency may justifiably not only assume the conduct of research studies in the field of mental health as they relate to the application of preventive measures and the promotion of positive good mental health, but it may serve also as a depository for the collection and dissemination of information on various research projects undertaken by various other agencies for research in this particular field, through its correlating and coordinating efforts.

A comprehensive mental health program as it relates to the Federal Government involves only indirectly the question of medical education, excepting insofar as the need arises for recruiting competently trained personnel or the training of such of its employees as may be required for carrying out the essential features of its particular work.

Measures necessary for the control of mental disease, in an effort to minimize the threat of a possible increase, involve those applicable to an individual on the one hand and to the population mass on the other hand. Further studies and observations are necessary before developing a concerted and uniform policy with reference to birth control, human sterilization, institutional segregation, and community supervision. Since authority for the regulation of foreign immigration is vested in the Federal Government, it is necessary, in accordance with law, that the Public Health Service continue the medical functions associated with the examination and exclusion of mentally unfit immigrants.

There is need for greater uniformity in the matter of interchanging mentally disordered persons between jurisdictions having responsibility for their care, and it is possible that a national health agency may be of assistance in these matters by serving as a depository for the collection, correlation, and dissemination of information on that subject, to the end that a more satisfactory economic solution may be found.

There is overwhelming evidence that the responsibility for mental health or mental hygiene belongs in the field of the medical profession, since the diagnosis and recognition of the nature and causes of mental ill health are the foundations upon which the whole superstructure of mental health or mental hygiene must be built.

Measures for uprooting community sources of mental illness must eventually be integrated with the interests of a regularly constituted local health agency and correlated with those of education methods and with measures for the correction of adverse situations in that particular field, with those of jurisprudence, and with those of a sociological and epidemiological character.

DEATHS DURING WEEK ENDED FEBRUARY 1, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb 1, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,468	9,092
Deaths per 1,000 population, annual basis	13 2	12 7
Deaths under 1 year of age	575	627
Deaths under 1 year of age per 1,000 estimated live births	52	57
Deaths per 1,000 population, annual basis, first 5 weeks of year	13 4	13 1
Data from industrial insurance companies.		
Policies in force	67,819,150	67,211,808
Number of death claims	13,775	14,497
Death claims per 1,000 policies in force, annual rate	10.6	11.2
Death claims per 1,000 policies, first 5 weeks of year, annual rate	10.5	11.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended February 8, 1936, and February 9, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 8, 1936, and Feb. 9, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 8, 1936	Week ended Feb 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935
New England States:								
Maine	2	2	3	1	424	238	2	0
New Hampshire					18	4	0	0
Vermont		1			191	4	0	0
Massachusetts	3	10			435	612	2	0
Rhode Island	1			5	99	26	0	0
Connecticut [1]	1	6	4	9	124	617	1	1
Middle Atlantic States:								
New York	54	23	[2] 60	[2] 38	1,408	1,313	14	4
New Jersey	11	11	11	30	61	219	4	1
Pennsylvania	46	45			283	2,541	6	6
East North Central States:								
Ohio	27	60	20	40	181	516	7	7
Indiana	43	38	52	111	32	628	6	4
Illinois	36	59	43	72	30	2,101	15	13
Michigan	9	6	3	6	42	501	7	0
Wisconsin	4	1	56	187	81	1,279	2	0
West North Central States:								
Minnestoa	4	12		41	120	2,135	2	1
Iowa	6	11	6	214	11	1,023	2	0
Missouri	22	25	184	396	17	457	8	0
North Dakota	2	5	3	33	1	152	0	0
South Dakota	5	2			4	74	1	0
Nebraska	2	7	5	20	51	520	1	5
Kansas	11	11	68	61	16	1,139	5	2
South Atlantic States:								
Delaware		4			74		0	0
Maryland [3]	5	8	7	180	112	59	11	4
District of Columbia	12	18	1	7	7	11	4	2
Virginia	22	24			37	930	11	2
West Virginia	17	23	151	371	2	529	2	11
North Carolina [1]	28	23	67	198	28	778	2	4
South Carolina [1]	2	3	1,009	1,022	10	17	2	0
Georgia [1]	10	4	490	535			0	0
Florida	9	3	4	80	2	26	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 8, 1936, and Feb. 9, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb. 8, 1936	Week ended Feb 9, 1935
East South Central States:								
Kentucky	9	23	101	383	70	666	11	5
Tennessee	10	17	176	351	29	18	6	6
Alabama [1]	12	21	334	2,392	25	256	0	1
Mississippi [3]	8	8					0	1
West South Central States:								
Arkansas	12	2	166	81	2	13	0	5
Louisiana	13	46	31	63	96	71	0	0
Oklahoma [4]	9	12	285	279	1	59	7	2
Texas [1]	48	56	491	901	126	123	9	2
Mountain States:								
Montana	6	2	6	503	20	223	1	1
Idaho			8	1	50	74	1	1
Wyoming	1				5	210	0	1
Colorado	3	3			34	586	1	0
New Mexico	7	5	2	80	9	20	0	1
Arizona	4	1	175	214	13	10	0	1
Utah [3]					4	10	0	0
Pacific States.								
Washington	1			33	182	107	2	3
Oregon	5		33	181	616	81	1	1
California	46	54	522	461	1,336	262	9	6
Total	583	690	4,577	9,530	6,519	21,268	165	104
First 6 weeks of year	4,268	4,792	17,503	54,192	31,671	95,006	1,011	539

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 8, 1936	Week ended Feb 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb 8, 1936	Week ended Feb 9, 1935	Week ended Feb 8, 1936	Week ended Feb. 9, 1935
New England States·								
Maine	0	1	47	18	0	0	0	2
New Hampshire	0	0	6	10	0	0	0	0
Vermont	2	0	16	17	0	0	0	0
Massachusetts	0	0	250	169	0	0	0	1
Rhode Island	0	0	30	12	0	0	1	0
Connecticut [1]	0	0	69	49	0	0	2	0
Middle Atlantic States.								
New York	1	3	955	699	0	0	7	5
New Jersey	0	0	276	138	0	0	1	1
Pennsylvania	2	1	452	647	0	0	4	9
East North Central States.								
Ohio	0	0	304	867	3	2	3	4
Indiana	0	0	355	269	0	1	2	1
Illinois	0	1	756	954	12	2	2	9
Michigan	1	0	250	319	1	0	4	6
Wisconsin	0	0	646	627	11	35	4	3
West North Central States:								
Minnesota	0	0	315	122	12	2	1	1
Iowa	0	0	182	101	25	2	5	3
Missouri	4	2	145	119	17	4	0	5
North Dakota	0	0	86		2	0	1	0
South Dakota	0	0	30	10	14	2	0	3
Nebraska	0	0	188	39	53	27	0	0
Kansas	1	0	209	108	10	3	0	0
South Atlantic States:								
Delaware	0	0	7	22	0	0	0	0
Maryland [3]	0	0	73	97	0	0	1	4
District of Columbia	1	0	30	25	0	0	0	2
Virginia	0	0	40	78	0	0	3	3
West Virginia	1	2	42	157	0	0	2	1
North Carolina [1]	0	1	26	26	0	0	4	0
South Carolina [1]	0	0	3	10	0	0	0	4
Georgia [1]	0	0	19	2	0	0	1	2
Florida	0	0	3	16	0	0	3	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 8, 1936, and Feb. 9, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935	Week ended Feb. 8, 1936	Week ended Feb. 9, 1935
East South Central States:								
Kentucky	0	0	30	61	0	0	5	4
Tennessee	0	1	37	26	0	1	3	3
Alabama [1]	1	1	22	15	2	0	1	0
Mississippi [3]	0	0	11	21	0	0	1	3
West South Central States:								
Arkansas	0	0	18	15	0	3	1	1
Louisiana	0	1	15	25	0	0	2	15
Oklahoma [4]	1	0	21	32	2	1	2	5
Texas [1]	0	1	53	79	0	93	2	16
Mountain States:								
Montana	0	0	126	15	11	9	4	0
Idaho	0	0	75	10	2	0	2	0
Wyoming	0	0	101	19	5	12	0	0
Colorado	0	0	238	291	23	0	1	1
New Mexico	0	0	47	18	0	1	1	1
Arizona	0	0	22	35	0	0	0	2
Utah [3]	0	0	133	85	0	0	0	0
Pacific States:								
Washington	0	0	86	51	12	34	2	2
Oregon	1	0	45	59	2	2	0	0
California	2	8	421	227	0	5	2	4
Total	18	23	7, 326	6, 812	219	241	85	124
First 6 weeks of year	112	166	43, 097	37, 913	1, 245	1, 193	[illegible]30	880

[1] Typhus fever, week ended Feb. 8, 1936, 14 cases, as follows: Connecticut, 1; North Carolina, 1; South Carolina, 4; Georgia, 2; Alabama, 3; Texas, 3.
[2] New York City only.
[3] Week ended earlier than Saturday.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1935										
New Hampshire		3					6	16	0	0
South Dakota	4	26	4	1	31		6	150	40	9
Tennessee	11	282	45	250	3	27	3	344	0	84
November 1935										
North Carolina	5	347	83		60	22	18	309	3	34
Wisconsin	4	14	170		242		5	1, 470	36	11
December 1935										
Hawaii Territory	1	3	4, 073				0	1	0	5
Wisconsin	9	10	268		354		1	2, 155	57	6
January 1936										
Arkansas	18	52	395	75	16	26	0	76	6	10
Connecticut	9	14	66		374		0	265	0	5
Delaware	1	6	1		626		0	64	0	2
Indiana	13	177	190		231		3	1, 345	16	3
Missouri	16	143	992	11	90	1	3	1, 032	10	10
New Mexico	6	13	19	2	13		2	234	1	13
North Carolina	16	416	40		75	30	4	172	2	14

October 1935

	Cases
South Dakota:	
Chickenpox	65
Mumps	64
Ophthalmia neonatorum	1
Trachoma	2
Undulant fever	1
Whooping cough	24
Tennessee:	
Chickenpox	16
Dysentery (amoebic)	1
Dysentery (unspecified)	7
Epidemic encephalitis	2
German measles	1
Impetigo contagiosa	3
Mumps	14
Ophthalmia neonatorum	2
Paratyphoid fever	3
Scabies	10
Septic sore throat	8
Tetanus	4
Tularaemia	1
Typhus fever	1
Vincent's infection	5
Whooping cough	105

November 1935

	Cases
North Carolina:	
Chickenpox	308
German measles	14
Ophthalmia neonatorum	2
Paratyphoid fever	1
Septic sore throat	8
Typhus fever	4
Undulant fever	5
Whooping cough	130
Wisconsin:	
Chickenpox	3,371
Dysentery (amoebic)	1
Mumps	2,473
Ophthalmia neonatorum	3
Trachoma	1
Tularaemia	3
Undulant fever	13
Whooping cough	813

December 1935

	Cases
Hawaii Territory:	
Chickenpox	16
Dysentery (amoebic)	1
Leprosy	5
Mumps	6
Paratyphoid fever	2
Typhus fever	2
Whooping cough	36
Wisconsin:	
Chickenpox	4,410
Dysentery (amoebic)	2
Epidemic encephalitis	5
German measles	112
Mumps	4,225
Septic sore throat	23
Tularaemia	5
Undulant fever	6
Whooping cough	852

January 1936

	Cases
Anthrax:	
Delaware	1
Chickenpox:	
Arkansas	101
Connecticut	791
Delaware	94
Indiana	491
Missouri	451
New Mexico	179
North Carolina	607
Conjunctivitis:	
Connecticut	12
Dysentery:	
Connecticut (bacillary)	4
Missouri	5
New Mexico (amoebic)	2
New Mexico (unspecified)	1
Epidemic encephalitis:	
Connecticut	1
Indiana	1
Missouri	1
Food poisoning:	
New Mexico	7
German measles:	
Connecticut	445
Delaware	1
New Mexico	2
North Carolina	93

January 1936—Continued

	Cases
Mumps:	
Arkansas	306
Connecticut	466
Delaware	60
Indiana	379
Missouri	711
New Mexico	434
Ophthalmia neonatorum:	
North Carolina	2
Paratyphoid fever:	
Connecticut	2
Puerperal septicemia:	
New Mexico	6
Rabies in animals:	
Indiana	32
Missouri	7
Rocky Mountain spotted fever:	
North Carolina	1
Scabies:	
Delaware	1
Septic sore throat:	
Connecticut	11
Missouri	83
New Mexico	9
North Carolina	7
Trachoma:	
Arkansas	9
Connecticut	1
Missouri	20
Trichinosis:	
Connecticut	1
Tularaemia:	
Missouri	7
New Mexico	1
North Carolina	2
Undulant fever:	
Connecticut	4
Missouri	2
Whooping cough:	
Arkansas	36
Connecticut	282
Delaware	84
Indiana	139
Missouri	92
New Mexico	90
North Carolina	88

WEEKLY REPORTS FROM CITIES

City reports for week ended Feb. 1, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	2	1	3	0	0	0	6	26
New Hampshire:											
Concord	0		0	0	1	2	0	0	0	0	11
Manchester	0		0	1	2	1	0	0	0	0	13
Nashua	0			3	3	0	0		0	0	
Vermont:											
Barre	0		0	0	0	0	0	1	0	0	8
Burlington	0		0	0	0	4	0	0	0	0	10
Rutland	0		0	2	0	1	0	0	0	0	5
Massachusetts:											
Boston	4		1	127	33	55	0	8	1	14	270
Fall River	0		1	0	5	7	0	0	0	0	27
Springfield	0		0	1	3	6	0	1	0	5	44
Worcester	0		0	0	5	10	0	5	0	5	56
Rhode Island:											
Pawtucket	0		0	0	0	1	0	0	0	0	18
Providence	0		0	11	4	5	0	2	0	2	60
Connecticut:											
Bridgeport	0		0	0	2	2	0	1	1	0	37
Hartford	0		0	2	9	3	0	0	0	3	51
New Haven	0	2	1	0	3	1	0	1	0	16	43

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City reports for week ended Feb. 1, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
New York:											
Buffalo	0		2	10	18	63	0	5	0	9	135
New York	25	17	4	540	133	300	0	80	2	92	[illegible]
Rochester	1		0	0	9	2	0	1	1	4	83
Syracuse	0		0	17	6	18	0	1	0	27	47
New Jersey:											
Camden	0		0	3	3	13	0	3	0	7	40
Newark	0	1	0	5	11	90	0	10	0	19	111
Trenton	0		0	0	6	3	0	6	0	17	53
Pennsylvania:											
Philadelphia	4	2	1	235	88	77	0	21	2	59	496
Pittsburgh	6	2	4	18	32	100	0	7	0	26	196
Reading	0		0	1	4	6	0	1	0	4	39
Scranton	1			8		7	0		0	1	
Ohio:											
Cincinnati	3		0	3	19	10	0	13	0	10	188
Cleveland	5	40	2	47	16	39	0	9	1	67	202
Columbus	5	3	3	1	9	19	0	4	0	2	105
Toledo	1		0	13	5	5	0	5	0	7	90
Indiana:											
Anderson	4		0	0	0	2	1	0	0	0	
Fort Wayne	1		0	0	3	10	0	0	0	1	33
Indianapolis	3		0	1	23	29	0	9	0	16	126
Muncie	0		0	0	3	0	0	0	0	4	10
South Bend	0		0	0	4	1	0	1	0	1	23
Terre Haute	0		0	0	0	1	0	0	0	0	25
Illinois:											
Alton	0		0	0	0	0	0	0	0	0	11
Chicago	14	7	7	14	48	210	0	39	0	260	785
Elgin	0		0	1	0	0	0	0	0	0	10
Springfield	0		0	0	4	7	0	1	0	0	31
Michigan:											
Detroit	6	3	0	8	42	68	0	19	[illegible]	148	306
Flint	3		0	1	7	10	0	0	0	4	27
Grand Rapids	0		0	8	5	11	0	1	0	8	38
Wisconsin:											
Kenosha	0		1	0	0	6	0	1	0	4	10
Milwaukee	0	2	2	1	4	66	0	2	1	97	119
Racine	0		0	2	1	18	0	0	0	2	19
Superior	0		0	0	1	12	0	0	0	6	10
Minnesota:											
Duluth	0		0	2	0	2	0	0	0	7	17
Minneapolis	2		1	68	6	124	0	0	1	6	111
St. Paul	0		0	46	6	42	0	1	0	4	62
Iowa:											
Cedar Rapids	0			0		2	0		1	1	
Davenport	0			0		11	0		0	0	
Des Moines	1			0		3	1		0	0	29
Sioux City	0			2		[illegible]	17		0	0	
Waterloo	1			2		4	0		0	0	
Missouri:											
Kansas City	1		1	1	25	87	0	5	1	1	84
St. Joseph	1		0	0	11	5	0	2	0	0	37
St. Louis	8	2		3	22	87	0	10	1	3	237
North Dakota:											
Fargo	2		0	0	1	13	0	0	0	1	6
Grand Forks	0			0		0	1		0	1	
Minot	0		0	0	0	9	0	0	0	0	2
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Nebraska:											
Omaha	0		1	5	11	76	3	1	0	1	59
Kansas:											
Lawrence	0		0	0	0	1	0	0	0	0	
Topeka	0		2	0	5	21	0	1	0	0	40
Wichita	1		0	1	7	23	0	1	0	1	38
Delaware:											
Wilmington	1		0	1	4	2	0	3	0	7	35
Maryland:											
Baltimore	3	6	0	17	24	24	0	9	2	30	224
Cumberland	1		0	0	0	1	0	0	0	0	15
Frederick	0		0	0	3	0	0	0	0	0	4
District of Columbia:											
Washington	19	4	3	6	24	16	0	10	1	7	168
Virginia:											
Lynchburg	0		0	8	3	1	0	0	0	[illegible]	11
Norfolk	3		0	0	4	2	0	3	0	1	34
Richmond	0		1	0	13	0	0	3	1	5	76
Roanoke	1		0	0	1	2	0	1	0	0	17

City reports for week ended Feb. 1, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
West Virginia:											
Charleston	0		0	0	3	1	0	0	0	0	24
Huntington	1			0		1	0		0	0	
Wheeling	1		1	1	1	0	0	0	0	1	25
North Carolina:											
Gastonia	0	1	0	0	0	0	0	0	0	0	7
Raleigh	0		0	0	3	2	0	1	0	6	15
Wilmington	0		0	0	0	0	0	0	0	0	5
Winston-Salem	1	1	0	29	7	3	0	0	0	0	19
South Carolina:											
Charleston	0	99	1	1	4	4	0	0	1	3	28
Columbia											
Florence	0		0	0	2	0	0	0	0	0	17
Greenville	0		0	12	1	0	0	1	0	0	22
Georgia:											
Atlanta	6	21	1	0	7	14	0	5	0	0	96
Brunswick	1	1	1	0	4	0	0	0	0	0	9
Savannah	0	31	0	0	6	3	0	4	0	2	39
Florida:											
Miami	2	2	0	0	2	7	0	8	0	3	50
Tampa	0		0	0	1	2	0	2	0	0	30
Kentucky:											
Ashland	1			0		0	0		0	0	
Covington	2		0	0	2	3	0	2	0	2	21
Lexington	0		0	0	5	0	0	2	0	0	25
Louisville	1	7	0	0	18	21	0	6	0	8	84
Tennessee:											
Knoxville	1	13	1	0	5	0	0	0	0	0	14
Memphis	0		0	0	9	3	0	6	0	3	69
Nashville	0		1	0	3	4	0	0	0	0	59
Alabama:											
Birmingham	2	10	2	0	15	4	0	2	0	1	80
Mobile	1	2	0	0	4	1	0	0	0	0	25
Montgomery	0	2		0		0	0		0	0	
Arkansas:											
Fort Smith	0			0		0	0		0	0	
Little Rock	0		1	0	13	1	0	3	0	0	17
Louisiana:											
Lake Charles	1		0	0	0	0	0	0	0	0	2
New Orleans	4	5	2	11	21	5	0	10	0	4	187
Shreveport	1		0	12	13	4	0	3	0	0	44
Texas:											
Dallas	4	4	4	8	9	15	0	4	0	3	70
Fort Worth	4		1	0	2	6	0	1	0	0	37
Galveston	2		0	2	3	1	0	2	0	0	19
Houston	6		2	2	10	5	0	10	0	1	95
San Antonio	1	1	1	0	15	1	0	5	0	0	59
Montana:											
Billings	1		0	0	2	7	0	0	0	4	7
Great Falls	1		0	1	0	3	0	0	0	6	7
Helena											
Missoula	0		0	0	4	19	0	0	0	1	13
Idaho:											
Boise	0		0	0	1	6	0	0	0	0	9
Colorado:											
Colorado Springs	0		1	2	0	8	3	0	0	1	17
Denver	4		1	5	12	23	0	2	0	11	83
Pueblo	0		0	2	4	16	0	0	0	0	17
New Mexico:											
Albuquerque	3		1	1	4	19	0	6	0	2	23
Utah:											
Salt Lake City	2		0	0	1	35	0	1	0	6	40
Nevada:											
Reno											
Washington:											
Seattle	0		4	29	7	31	0	4	1	4	64
Spokane	0	1	1	4	3	6	0	1	0	1	29
Tacoma	0		0	2	3	7	0	0	0	3	33
Oregon:											
Portland	0		1	233	5	7	0	5	0	7	74
Salem	0			1		2	0		0	0	
California:											
Los Angeles	5	31	0	144	22	79	0	17	1	16	367
Sacramento	1		1	5	1	18	3	2	1	3	38
San Francisco	0	23	1	286	12	79	1	11	1	22	184

City reports for week ended Feb. 1, 1936—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	1	0
Springfield	1	1	0
Rhode Island:			
Providence	1	0	1
New York:			
Buffalo	0	1	0
New York	19	7	0
Rochester	1	0	0
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	1	0	0
Pittsburgh	1	0	0
Ohio:			
Cincinnati	3	3	0
Cleveland	3	1	0
Columbus	0	1	0
Toledo	1	0	0
Indiana:			
Indianapolis	0	1	0
Illinois:			
Chicago	6	3	0
Springfield	1	2	0
Michigan:			
Detroit	2	1	0
Minnesota:			
Minneapolis	3	0	0
St. Paul	1	0	0
Iowa:			
Des Moines	1	0	0
Missouri:			
Kansas City	1	0	0
St. Joseph	2	1	0
St. Louis	3	0	0
Kansas:			
Wichita	0	0	1
Maryland:			
Baltimore	12	4	0
District of Columbia:			
Washington	4	2	0
North Carolina:			
Raleigh	1	1	0
South Carolina:			
Charleston	1	0	0
Georgia:			
Atlanta	1	0	0
Kentucky:			
Louisville	1	0	0
Tennessee:			
Knoxville	1	1	0
Memphis	2	0	0
Nashville	1	2	0
Alabama:			
Birmingham	0	0	1
Louisiana:			
Shreveport	0	1	0
Texas:			
Dallas	1	0	0
Galveston	0	1	0
Houston	2	2	0
Colorado:			
Denver	1	0	0
Oregon:			
Portland	0	1	0
California:			
Los Angeles	2	0	0
Sacramento	2	1	0
San Francisco	0	1	0

Pellagra.—Cases: Savannah 4, Birmingham 2.
Typhus fever.—Cases: Baltimore 1, Savannah 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended January 25, 1936.—During the 2 weeks ended January 25, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				5	2		1		1	9
Chicken pox		21		473	935	108	71	20	210	1,838
Diphtheria		12	6	40	18	11	2	11		100
Dysentery				1	1	1				3
Erysipelas		2		8	5	8	1	8	7	39
Influenza		3			57	64	10		41	175
Lethargic encephalitis				1	2	1			8	12
Measles	6	90	6	1,162	3,233	579	1,055	64	643	6,838
Mumps		6	2		1,047	127	442	23	485	2,132
Paratyphoid fever					7					7
Pneumonia	1				42				11	54
Poliomyelitis								3		3
Scarlet fever		15	12	189	650	92	33	165	65	1,221
Smallpox									2	2
Trachoma							1		2	3
Tuberculosis	2	15	9	81	97	31	1	3	35	274
Typhoid fever			1	28	5	1	1	1		37
Undulant fever				2	11		1	1		15
Whooping cough	6	35	24	125	525	18	68	21	58	880

ITALY

Communicable diseases—4 weeks ended November 10, 1935.—During the 4 weeks ended November 10, 1935, cases of certain communicable diseases were reported in Italy as follows:

Disease	Oct. 14-20		Oct. 21-27		Oct. 28-Nov. 3		Nov. 4-10	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	30	25	26	25	35	25	39	38
Cerebrospinal meningitis	6	6	2	2	3	3	10	9
Chicken pox	108	62	131	65	126	67	159	89
Diphtheria and croup	530	286	632	301	591	292	718	351
Dysentery	16	14	18	15	4	3	19	12
Hookworm disease	29	6	12	9	8	7	7	6
Lethargic encephalitis	2	2	2	2	2	2	1	1
Measles	636	145	780	164	799	166	937	180
Paratyphoid fever	111	75	111	83	106	79	95	66
Poliomyelitis	33	23	23	19	25	18	30	21
Puerperal fever	30	28	46	42	40	38	43	38
Rabies					1	1		
Scarlet fever	488	182	608	205	546	210	685	229
Typhoid fever	850	407	875	438	667	371	820	426
Undulant fever	16	13	20	18	24	22	28	23
Whooping cough	132	55	179	61	144	48	197	66

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for January 31, 1936, pages 122-137. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued February 28, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

India—Bombay.—During the week ended January 25, 1936, 1 imported case of plague was reported in Bombay, India.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Itauna, Bahia State, December 21, 1935, to January 5, 1936, 2 cases, 2 deaths; Campo Grande, Matto Grosso State, January 13, 1936, 1 case, 1 death; Minas Geraes State, Santa Rita de Cassia, January 12, 1936, 1 case, 1 death; Santa Cruz das Areias, January 14, 1936, 1 case, 1 death; Altinopolis, January 15, 1936, 1 case, 1 death.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

W. F. Draper, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen. R. C. Williams, *Chief of Division*

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PUBLIC HEALTH REPORTS

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PREVENTION OF EXPERIMENTAL INTRANASAL INFECTION WITH CERTAIN NEUROTROPIC VIRUSES BY MEANS OF CHEMICALS INSTILLED INTO THE NOSTRILS [1]

By CHARLES ARMSTRONG and W. T. HARRISON, *Surgeons, United States Public Health Service*

Various experimental procedures have been found to influence the local susceptibility of the skin of animals to certain virus infections. Ledingham (1), for instance, showed that the introduction of india ink into the skin rendered the area relatively resistant to infection with vaccine virus. Le Fevre (2), Rivers, Stevens, and Gates (3), and others, found that various types of irradiation likewise tended to render the skin more resistant to this virus. Armstrong (4) demonstrated that diphtheria toxin produced a similar effect in rabbits and showed that the effect was the result of the tissue response rather than of any direct influence of the toxin on the virus. The same worker (5), moreover, showed that the mucous membranes of the eyes of rabbits behaved as did the skin in this regard, a result which led to an inquiry to determine whether the membranes of the nose, a natural route of infection, could be smilarly experimentally influenced.

Many chemicals have been recommended for introduction into the nostrils of man as a treatment for abnormal conditions with a view to producing an anodyne, protective, astringent, antiseptic, absorbent, or solvent action.

Flexner and Amoss (1920) (6) attempted to sterilize the poliomyelitis-inoculated nasal membranes of monkeys by means of chloramin-T and dichloramin-T, but concluded that antiseptic chemicals are of doubtful value and may even be objectionable.

Poulton (1932) (7) advocated an oily preparation, Glegg's mixture, which he had employed as early as 1921 for both treatment and prevention of common colds. He attributed its influence to the oily coating rendering the mucous membranes a less favorable environment for infecting organisms and advised a controlled field test of its prophylactic value. Olitsky and Cox (1934) (8) reported that three doses of tannic acid (0.5 to 1.0 percent) daily for 3 days exerted a temporary protective action in mice, but not in guinea pigs, against the

[1] From the National Institute of Health, Washington, D. C. Submitted for publication January 8, 1936.

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virus of equine encephalomyelitis. Armstrong (1935) (5) found that sodium aluminum sulphate (2 to 4 percent) instilled into the nostrils tended to protect mice against the virus of encephalitis (St. Louis type), and Armstrong and Harrison (1935) (9) demonstrated that, with 3 to 12 preliminary instillations of 4 percent sodium aluminum sulphate into the nostrils of 23 monkeys, 17 survived the intranasal instillation of poliomyelitis virus, while of 19 nonprepared controls identically inoculated but 3 survived.

These results, together with the fact that encephalitis and poliomyelitis are strikingly similar as to epidemiology, pathology, and probable route of infection, led us to feel that agents which tend to prevent intranasal infection with one of these neurotropic viruses might also be effective against the other.

Encephalitis in white mice has therefore been utilized by Armstrong as a relatively convenient and inexpensive indicator by which various agents have been compared as to their relative efficiency in preventing intranasal infection. Those solutions found most effective in mice have then been utilized by the authors in an attempt to prevent intranasally-inoculated poliomyelitis of monkeys.

EXPERIMENTAL METHOD (ENCEPHALITIS IN MICE)

Strength of solutions.—It was found necessary to make a preliminary titration of each chemical for its irritative properties, and to select a concentration which was relatively noninjurious when introduced into the nostrils of mice. When a concentration too irritating was employed, variable numbers of mice promptly developed difficulty in breathing, which often resulted in death. This result was thought to be due to a swelling of the membranes blocking the nares to the passage of air. This fact and, in certain instances, the relative insolubility of the chemicals in water, rendered it impracticable to employ a uniform concentration of the various agents tested.

Handling of mice.—Three to six chemicals were usually compared in one test, each solution being applied to from 25 to 40 mice. The mice for each experiment were selected at random from the same shipments, equal numbers being placed in similar cages and identically fed and cared for throughout the trial.

The mice of each cage received from three to seven intranasal instillations of the selected chemical, in the predetermined concentration, at intervals of 2 to 7 days. The mice were lightly etherized and 0.04 cc of the solution was dropped into the nostrils from a 22-gage needle attached to a 0.25-cc syringe, the mouse being held ventral side upward, with the head slightly lower than the body. The virus inoculations were made in the same manner.

Virus for making the infective inoculations was prepared by grinding three glycerinated brains taken from mice near death from encephalitis and diluting with saline to a 1:450 suspension. Then 0.03 of a cubic centimeter of this freshly prepared suspension was administered into the nostrils of each mouse from 3 to 5 days following the last chemical instillation.

In order to compensate for the possible loss in potency of the virus during administration, mice were taken one from each cage, in rotation, until all were inoculated, the same syringe being employed for all. Mice were observed for 15 days thereafter and deaths recorded.

CHEMICALS TESTED ON MICE

The following agents have been compared by this procedure: Cobra venom, sodium chloride, distilled water, alum, formalin, glucose, ferric chloride, aluminum sulphate, manganese chloride, zinc chloride, aluminum chloride, picric acid, tannic acid, lead acetate, sea water, thymol, tribrom-phenol, picramic acid, dinitrocresol, dinitrophenol, and quinine hydrochloride, in one or more concentrations and either alone or combined in certain instances (table 1).

TABLE 1.—*Effect of intranasal chemicals on intranasally inoculated encephalitis of mice*

Chemical intranasally instilled	Concentration	Number of applications	Number of mice given treatment	Number of mice surviving: To virus	Number of mice surviving: 4 days after virus	Number of mice surviving: 14 days after virus	Percentage surviving	Average duration life (up to 14 days)	Protection index = average days life after virus + percent dying
June 18, 1934									
Cobra venom	1 5800	3	30	22	22	2	9 1	8 1	0 080
	Percent								
Sodium chloride	5	3	25	18	17	4	23 5	9 4	123
Distilled water	100	3	25	21	21	5	23 8	7 9	103
Controls			20	18	18	4	22 2	9 3	119
July 18, 1934									
Alum Formalin	4 2	7	30	19	19	15	79 0	10 0	477
Sodium chloride Formalin	4 2	7	30	21	20	12	60 0	8 6	215
Alum Formalin plus killed virus	4 2	7	30	19	16	14	87 5	9 5	76
Sodium chloride Formalin plus killed virus	4 2	7	30	11	10	6	60 0	9 5	236
Glucose	15	7	30	27	25	12	48 0	9 1	175
Controls			30	21	21	8	38 0	8 0	129
July 31, 1934									
Alum	3	7	45	38	35	29	83 0	10 0	580
Sodium chloride	4	7	45	33	31	20	64 0	9 1	252
Glucose	15	7	45	27	25	12	48 0	9. 1	175
Controls			45	42	42	16	38 0	8 0	.129
Nov 16, 1934									
Alum	3	3	30	29	29	21	72 4	8 8	319
Do	1 5	3	30	29	29	17	58. 6	8 4	202
Do	75	3	30	29	29	13	44 9	8. 1	147
Alum Glucose	2 7	3	30	24	24	12	50 0	8. 2	.164
Controls	-------	------	30	28	28	18	64 3	8. 7	244

TABLE 1.—*Effect of intranasal chemicals on intranasally inoculated encephalitis of mice*—Continued

Chemicals intranasally instilled	Concentration	Number of applications	Number of mice given treatment	Number of mice surviving: To virus	Number of mice surviving: 4 days after virus	Number of mice surviving: 14 days after virus	Percentage surviving	Average duration life (up to 14 days)	Protection index—average days life after virus+percent dying
Apr. 24, 1935									
Alum plus NaOH to near precipitation	4	4	26	17	15	5	33.3	7.7	.115
Alum, acidulated H_2SO_4	4	4	25	18	13	2	15.4	9.2	.108
Alum plus NaOH plus ¼ vol. adrenalin 1 . 1,000	4	4	26	8	3	0	0	-------	0
Alum, acidulated H_2SO_4 plus ¼ vol. adrenalin 1 : 1,000	4	4	25	11	8	5	62.5	7.3	.194
Controls	-------	0	25	18	16	2	12.5	7.3	.086
June 15, 1935									
Ferric chloride	.16	3	25	16	16	11	68.6	9.2	.292
Aluminum sulphate	.24	3	25	14	10	1	10.0	9.4	.104
Manganese chloride	.57	3	25	8	8	6	75.0	9.5	.36
Zinc chloride	18	3	25	21	20	13	65.0	8.3	.237
Aluminum chloride	.43	3	25	17	14	2	14.3	7.4	.096
Controls	-------	3	25	18	15	6	40.0	8.6	.143
Jan. 18, 1935									
Tannic acid	1	3	30	14	14	9	64.2	8.6	.24
Alum	3	3	30	20	19	10	52.6	9.8	.207
Lead acetate	1	3	30	16	16	8	50.0	8.0	.160
Picric acid	.64	3	30	27	26	22	84.6	8.2	.533
Feb. 20, 1935									
Alum	3	3	30	23	22	18	81.8	7.2	.394
Picric acid	Sat. Sol.	3	30	28	28	25	89.3	7.6	.709
Tannic acid	1	3	30	14	13	6	46.1	8.0	.148
Controls	-------	3	30	26	25	13	52.0	8.3	.173
Aug. 5, 1935									
Picric acid	.64	4	31	28	28	17	60.7	8.4	.213
Do.	.32	4	31	27	27	16	59.3	8.2	.206
Alum	2								
Picric acid	.32	4	31	28	28	14	50.0	8.6	.172
Zinc chloride	.09								
Picric acid	.32	4	31	30	30	15	50.0	7.7	.154
Manganese chloride	.16								
Picric acid	.32	4	31	30	30	15	50.0	7.7	.154
Ferric chloride	.05								
Controls	-------	-------	31	30	30	10	33.3	7.7	.115
Sept. 20, 1935									
Sea water	100	5	30	25	25	6	24.0	7.9	.104
Picric acid	.64	5	30	23	23	12	52.2	8.5	.178
Thymol	Sat. sol.	5	30	29	28	12	42.9	7.8	.136
Tribromphenol	±3	5	30	27	27	8	29.6	8.2	.116
Picramic acid	.5	5	30	21	21	4	19.1	8.2	.101
Controls	-------	-------	30	22	18	2	11.1	7.9	.089
Nov. 6, 1935									
3-5 dinitro-o-cresol	.5	5	30	28	27	8	29.6	7.4	.109
2-4-6 tribromphenol	.5	5	30	28	27	11	40.7	7.7	.129
2-4 dinitrophenol	.5	5	30	27	25	6	24.0	7.6	.1
Picric acid	.64	5	30	28	26	18	50.0	7.2	.144
Alum	3	5	30	23	22	8	36.9	7.8	.106
Controls	-------	-------	30	28	27	3	11.1	7.8	.086
Nov. 21, 1935									
Picric acid in H_2O	.32	4	40	33	32	7	21.9	7.8	.099
Picric acid in saline	.32	4	40	39	35	13	37.1	7.6	.121
Controls	-------	-------	40	37	36	2	5.5	6.5	.069
Dec. 30, 1935									
Quinine hydrochloride	1.5	5	40	31	28	6	21.4	7.9	.103
Picric acid	.32	5	40	32	30	9	30.0	8.0	.114
Controls	-------	-------	40	37	35	5	14.3	7.3	.085

RESULTS IN MICE

The protective value of a chemical against experimental intranasal infections may be evidenced by delayed deaths as well as by the proportion of mice surviving. Consequently these factors have been combined to form a prophylactic index, arrived at by dividing the average length of life, up to 14 days, following the virus inoculation by the percentage of mice dying. Deaths occurring during the 4 days immediately following the virus application have been found not to be due to the virus inoculated, hence, are eliminated from the compilation. These early deaths, together with those dying prior to the virus application do, however, give an idea of the comparative toxic or irritative effect of the various chemicals and should be considered in determining the practicability of any experimental solution.

By the above methods it is possible to select the relatively most harmless and effective chemical from each test and to select solutions to be compared in further tests as desired. By reference to table 1 it may be seen that picric acid stands out as one of the least irritating or least toxic agents as well as the most effective experimental prophylactic agent tried, being superior in both these regards to sodium aluminum sulphate. It was therefore utilized in an attempt to prevent intranasally inoculated poliomyelitis of monkeys.

EXPERIMENTAL METHOD (POLIOMYELITIS OF MONKEYS)

Fresh monkeys were given identical care and treatment except that the test animals received three to six instillations of varying concentrations of picric acid, alone or combined with alum, into the nostrils, prior to the virus inoculations, by means of a tuberculin syringe from which the needle had been removed. The controls received no treatment whatever, as it had been determined in a previous test that saline instillations exerted no effect. Picric acid and alum in the same solution were employed in some instances because it was deemed possible that these agents might produce their protective effect in different ways, and thus supplement each other in their effects.

Virus for each test was prepared by grinding portions of cords from several monkeys recently dead of poliomyelitis and diluting to 4 percent suspension with 0.85 percent saline. Centrifugation was carried out at slow speed to remove gross particles and the supernatant fluid used for intranasal inoculation. Three inoculations of 1 cc were administered into each nostril at intervals of 24 hours. Temperatures were taken daily. Animals which developed poliomyelitis were allowed to go until complete paralysis developed, when they were etherized, autopsy was performed, and the tissues were submitted for pathological confirmation as to the cause of death.

RESULTS IN MONKEYS (POLIOMYELITIS VIRUS)

In order to determine whether picric acid would protect monkeys against intranasally inoculated poliomyelitis virus, as it did mice against encephalitis virus, a rapid test was carried out (table 2, experiment 1). Four monkeys were given 1.5 cc of 0.64 percent picric acid in water up each nostril on July 6, 8, and 9 (1935); on July 11, 12, and 13 these monkeys and four controls each received intranasally 1 cc of the supernatant fluid from a centrifuged 4 percent suspension of mixed poliomyelitis virus. Three of the four prepared animals survived while all four controls died of poliomyelitis.

In view of these encouraging results a comparative test of the efficacy of picric acid, picric acid plus alum, and our most effective previous agent, alum, was undertaken (table 2, experiment 2). Groups of 4 monkeys were intranasally inoculated (both nostrils) with 1.5 cc of 0.64 percent picric acid, a solution of 2 percent alum in 0.32 percent picric acid, and 4 percent alum, respectively, on August 28, August 30, September 6, 10, 12, and 14 (1935). On September 18, 19, and 20 each group of monkeys, together with the nonprepared controls, were given 1 cc of supernatant fluid from a centrifuged 4 percent suspension of mixed poliomyelitis virus into each nostril. The four picric acid and the four picric acid-alum prepared animals survived, while two of the alum prepared animals and the four controls died of poliomyelitis.

These results indicate that, in the concentrations employed, picric acid either alone or in combination with alum is superior to alum alone. Furthermore, it appears that the protective effect is cumulative, since three instillations of picric acid (table 2, experiment 1) protected but three or four animals while six instillations (table 2, experiment 2) protected all of four monkeys.

The number of monkeys is small; however, the results are strictly in accord with findings in the mouse-encephalitis studies and they tend to increase confidence in the latter as a cheap and convenient indicator in the selection of chemicals for trial in the monkey-poliomyelitis tests.

In order to determine whether weaker solutions would prove effective, groups of four monkeys each were given intranasal instillations, respectively, of 1.5 cc of 0.32 percent picric acid, 0.16 percent picric acid, and solutions containing 0.16 percent picric acid with 0.5 percent alum and 0.08 percent picric acid with 0.25 percent alum, on October 29, 31, and November 2, 4, 6, and 8 (1935), (table 2, experiment 3). On November 12, 13, and 14 these animals and 4 controls were each given 1 cc of 4 percent poliomyelitis virus prepared as in experiments 2 and 3.

Two animals died of colitis prior to receiving the virus, but the condition was not related to the nasal instillations, as several unused

TABLE 2.—*Preventive effect of chemicals in monkeys*

Monkey no.	Intranasal preparation and inoculation									Day of complete paralysis following first intranasal virus inoculation		Onset of fever by days following first virus inoculation		Clinical and pathological diagnosis
				7-6-35	7-8-35	7-9-35	7-11-35	7-12-35	7-13-35	Prepared	Controls	Prepared	Controls	
Experiment 1:														
965	—	—	—	0 64 P	0 64 P	0 64 P	V	V	V	10	----	6	----	Poliomyelitis.
967	—	—	—	0 64 P	0 64 P	0 64 P	V	V	V	8	----	----	----	
963	—	—	—	0 64 P	0 64 P	0 64 P	V	V	V	8	----	----	----	
968	—	—	—	0 64 P	0 64 P	0 64 P	V	V	V	8	----	----	----	
964	—	—	—	—	—	—	V	V	V	----	21	----	7	Do.
966	—	—	—	—	—	—	V	V	V	----	15	----	8	Do.
969	—	—	—	—	—	—	V	V	V	----	9	----	4	Do.
970	—	—	—	—	—	—	V	V	V	----	9	----	5	Do.
	8-28-35	8-30-35	9-6-35	9-10-35	9-12-35	9-14-35	9-18-35	9-19-35	9-20 35					
Experiment 2:														
1009	0.64 P	0 64 P	0.64 P	0 64 P	0.64 P	0 64 P	V	V	V	8	----	----	----	
1010	0.64 P	0 64 P	0 64 P	0 64 P	0.64 P	0 64 P	V	V	V	8	----	----	----	
1011	0.64 P	0 64 P	0 64 P	0 64 P	0 64 P	0 64 P	V	V	V	8	----	----	----	
1012	0.64 P	0 64 P	0 64 P	0 64 P	0 64 P	0 64 P	V	V	V	8	----	----	----	
1005	P A	P A	P A	P A	P A	P A	V	V	V	8	----	----	----	
1006	P A	P A	P A	P A	P A	P A	V	V	V	8	----	----	----	
1007	P A	P A	P A	P A	P A	P A	V	V	V	8	----	----	----	
1008	P A	P A	P A	P A	P A	P A	V	V	V	8	----	----	----	
1001	4 A	4 A	4 A	4 A	4 A	4 A	V	V	V	8	----	----	----	
1002	4 A	4 A	4 A	4 A	4 A	4 A	V	V	V	9	----	5	----	Do.
1003	4 A	4 A	4 A	4 A	4 A	4 A	V	V	V	9	----	6	----	Do.
1004	4 A	4 A	4 A	4 A	4 A	4 A	V	V	V	8	----	----	----	
996	—	—	—	—	—	—	V	V	V	----	9	----	5	Do.
997	—	—	—	—	—	—	V	V	V	----	9	----	5	Do.
998	—	—	—	—	—	—	V	V	V	----	10	----	6	Do.
999	—	—	—	—	—	—	V	V	V	----	10	----	6	Do.

TABLE 2.—*Preventive effect of chemicals in monkeys*—Continued

Monkey no.	Intranasal preparation and inoculation									Day of complete paralysis following first intranasal virus inoculation		Onset of fever by days following first virus inoculation		Clinical and pathological diagnosis
	10-29-35	10-31-35	11-2-35	11-4-35	11-6-35	11-8-35	11-12-35	11-13-35	11-14-35	Prepared	Controls	Prepared	Controls	
Experiment 3:														
72	0.32 P	0.32 P	0.32 P	0.32 P	0.32 P	0.32 P	V	V	V	S				
73	0.32 P	0.32 P	0.32 P	0.32 P	0.32 P	0.32 P	V	V	V	13		3		Poliomyelitis.
74	0.32 P	0.32 P	0.32 P	0.32 P	0.32 P	Died	—	—	—	—				Acute colitis.
75	0.32 P	0.32 P	0.32 P	0.32 P	0.32 P	0.32 P	V	V	V	S				
80	0.16 P	0.16 P	0.16 P	0.16 P	0.16 P	0.16 P	Died	—	—	—				Do.
81	0.16 P	0.16 P	0.16 P	0.16 P	0.16 P	0.16 P	V	V	V	S				
82	0.16 P	0.16 P	0.16 P	0.16 P	0.16 P	0.16 P	V	V	V	S				
83	0.16 P	0.16 P	0.16 P	0.16 P	0.16 P	0.16 P	V	V	V	S				
76	P A′	P A′	P A′	P A′	P A′	P A′	V	V	V	S				
77	P A′	P A′	P A′	P A′	P A′	P A′	V	V	V	S				
78	P A′	P A′	P A′	P A′	P A′	P A′	V	V	V	S				
79	P A′	P A′	P A′	P A′	P A′	P A′	V	V	V	S				
84	P′ A	P′ A	P′ A	P′ A	P′ A	P′ A	V	V	V	*9		4		Poliomyelitis.
85	P′ A	P′ A	P′ A	P′ A	P′ A	P′ A	V	V	V	*8		13		Poliomyelitis (paralysis legs).
86	P′ A	P′ A	P′ A	P′ A	P′ A	P′ A	V	V	V	*10		3		Poliomyelitis.
87	P′ A	P′ A	P′ A	P′ A	P′ A	P′ A	V	V	V	*7		3		Do.
88	—	—	—	—	—	—	V	V	V		7		4	Do.
89	—	—	—	—	—	—	V	V	V		S			No symptoms.
90	—	—	—	—	—	—	V	V	V		7		2	Poliomyelitis.
91	—	—	—	—	—	—	V	V	V		10		3	Do.

0.64 P=0.64 percent picric acid in distilled water, 1.5 cc each nostril.
P A=Mixture of 2 percent sodium aluminum sulphate in 0.32 percent picric acid, 1.5 cc each nostril.
4 A=4 percent sodium aluminum sulphate, 1.5 cc each nostril.
0.32 P=0.32 percent picric acid.
0.16 P=0.16 percent picric acid.
P A′=Mixture of 0.5 percent sodium aluminum sulphate in 0.16 percent picric acid, 1.5 cc each nostril.
P′ A=Mixture of 0.25 percent sodium aluminum sulphate in 0.08 percent picric acid, 1.5 cc each nostril.
—=Controls, no preparation.
S=Survived.
V=Mixed poliomyelitis virus, 1 cc 4 percent suspension each nostril.
*=Excluded from following compilations owing to too great dilution of chemicals.

monkeys from this shipment died of the ailment. Three animals received 0.32 percent picric acid, of which two survived the virus instillations and one died of poliomyelitis; three received 0.16 percent picric acid and all survived; four received 0.16 percent picric acid in 0.5 percent alum solution, and all survived; while of four monkeys getting 0.08 percent picric acid in 0.25 percent alum, three died of poliomyelitis and one recovered, following symptoms, with paralysis of the right front leg. Four nonprepared controls were similarly inoculated with virus, of which three died and one survived without symptoms.

It is thus apparent that picric acid in dilutions as low as 0.16 percent exerted a definite protective effect, while 0.08 percent in 0.25 percent alum solution afforded no protection. Excluding this latter group as inadequately prepared, it is found that the survivals among the variously prepared groups were as follows:

TABLE 3.—*Summary of results (monkeys and poliomyelitis)*

Preparation	Monkeys treated				Controls			
	Total number of monkeys inoculated	Monkeys surviving poliomyelitis inoculations			Number inoculated	Monkeys surviving poliomyelitis inoculations		
		Number	Percent			Number	Percent	
Picric acid	14	12	86	91	12	1	8.3	10
Picric acid plus alum	8	8	100		8	1	12.5	
Alum	4	2	50	70	4	0	0	13
Alum (previously reported (9))	23	17	74		19	3	15.8	

As here employed it thus appears that picric acid alone or combined with alum is superior to alum alone in preventing intranasally inoculated poliomyelitis of monkeys and encephalitis of mice (tables 1, 2, 3). The solutions utilized in these tests were made with distilled water, but subsequent tests (table 1) indicate that solutions made with 85 percent saline are possibly more effective as well as being probably less irritating, and will therefore be used in future trials.

EFFECT OF PICRIC ACID ON THE MUCOUS MEMBRANES

The nasal membranes from 3 monkeys treated with 5 to 6 instillations of 0.64 percent picric acid and from 1 treated with 5 instillations of 0.32 percent picric acid in distilled water have been studied microscopically by Surg. R. D. Lillie, along with the membranes from 10 nontreated animals. It was not possible to distinguish the membranes from the two groups. In order that more visible membranes might be studied, 0.64 percent picric acid was repeatedly instilled

into the left eye of 4 monkeys on alternate days for 4 to 12 doses, but no apparent evidence of irritation was observed and 2 of the treated eyes were examined histopathologically and found normal.

The left eyes of two additional monkeys were instilled with 0.64 percent picric acid in saline every other day for a month without evidence of inflammation.

The authors have taken 16 instillations of 0.32 percent picric acid in 0.85 percent saline, sprayed from an atomizer, into their own nostrils at intervals of 1 to 6 days. The treatments were largely devoid of temporary tingling, stinging, and increased secretions occasioned by 1 percent alum solution (9). In fact the picric solution occasioned but slightly more local discomfort than did 0.85 percent saline alone; neither was any cumulative influence noted. There was, however, a bitter taste apparent from the pharynx which lasted for some minutes following the nasal spray, but was not especially disagreeable. No impairment of smell was noted. The yellowish color of the solution left no skin stain provided it was wiped away before drying occurred.

IMMUNITY

Mice which survive the intranasal instillation of encephalitis virus either with or without preliminary intranasal preparation, are, after a lapse of from 2 to 3 weeks, found to be from 30 to 80 percent immune to death following an intracerebral inoculation which is fatal to 100 percent of control mice, while a partial immunity, evidenced by delayed symptoms and death, is present in many of the prepared mice which die. Surviving monkeys have not been tested by reinoculation.

ACTION OF PICRIC ACID

Picric acid, as here employed, apparently produced no general ill effects in mice or monkeys; neither did it produce changes detectable by ordinary pathological methods in the nasal mucous membranes of the latter. That it exerts its protection through a local action is, however, indicated by the fact that picric acid intranasally administered to mice apparently affords no protection against intracerebrally inoculated virus. This local action may consist in some alteration in the nasal membranes which render them less permeable to the virus, although it is conceivable that the drug, either free or united with the cells of these structures, may exert a direct effect upon the virus itself.

INFLUENCE OF TIME OF TREATMENT IN RELATION TO VIRUS ADMINISTRATION (MICE)

It is conceivable that certain time relationships might occur which would tend to render the portal of entry for the virus increasingly, rather than less permeable to infection. In order to test this possi-

bility, five groups of mice were given, respectively, one intranasal instillation of 0.32 percent picric acid on the day of exposure to the virus, 1 and 2 days before, and 1 and 2 days after exposure. One control group received no picric acid. The results shown in table 4 indicate that the picric-acid treatment tended, under conditions of the experiment, always to reduce susceptibility of the mice groups. The protection afforded was greatest, however, when the chemical was administered prior to the virus instillations. Alum was found to act similarly (9).

TABLE 4.—*Effect of intranasal administration of 0.32 percent picric acid before, after, and on the same day as the virus administration (encephalitis)*

Number of mice receiving virus inoculations	Intranasal treatment (day of administration)					Deaths by dates												Survivals	Percent survivals
	12-17	12-18	12-19	12-20	12-21	12-22	12-23	12-24	12-25	12-26	12-27	12-28	12-29	12-30	12-31	1-1	1-2		
33	P	—	V	—	—	1	----	----	----	1	4	3	1	----	1	1	----	21	64
32	—	P	V	—	—	----	1	----	----	----	2	1	1	----	----	1	----	26	81
33	—	—	{V P}	—	—	----	----	----	----	2	4	3	3	----	----	----	----	21	64
33	—	—	V	P	—	----	----	----	----	3	6	3	2	----	----	----	1	18	55
33	—	—	V	—	P	----	1	----	----	2	3	4	1	2	----	----	----	20	61
33	—	—	V	—	—	----	1	----	----	9	3	5	1	1	----	----	----	13	39

P=0.32 percent picric acid solution (in saline)
V=Encephalitis virus (0.03 cc 1 430 suspension).
—=No treatment

Influence of variation in frequency of application and of concentration of picric acid on the prevention of poliomyelitis in monkeys.—In order to determine the influence which the frequency of application of a given concentration of picric acid has upon the prevention of poliomyelitis in animals, a group of four monkeys was given four intranasal instillations of 0.32 percent solution of picric acid in saline, at intervals of 7 days. The animals then received three intranasal inoculations of poliomyelitis virus on the sixth, seventh, and eighth days following the last picric-acid application. One monkey of this group died of poliomyelitis and three survived without symptoms (table 5).

TABLE 5.—*Picric acid, 0.16 and 0.32 percent at 7- and 4-day intervals*

Monkey no.	Dec. 30, 1935	Date of picric acid instillations and strength of solution in parts per 100 (1936)							Date of administration of virus (1936)			Days first dose of virus to fever	Days first dose virus to complete paralysis	Diagnosis
		1-6	1-11	1-13	1-15	1-19	1-20	1-23	1-26	1-27	1-28			
104	0.32 P	0.32 P		0.32 P			0.32 P		V	V	V		S	
105	.32 P	.32 P		.32 P			.32 P		V	V	V	4	10	Poliomyelitis.
106	.32 P	.32 P		.32 P			.32 P		V	V	V		S	
107	.32 P	.32 P		.32 P			.32 P		V	V	V		S	
108	.16 P	.16 P		.16 P			.16 P		V	V	V	5	10	Do.
109	.16 P	.16 P		.16 P			.16 P		V	V	V		S	
110	.16 P	.16 P		.16 P			.16 P		V	V	V		S	
111	.16 P	.16 P		.16 P			.16 P		V	V	V	4	11	Do.
112			0.32 P		0.32 P	0.32 P		0.32 P	V	V	V		S	
113			.32 P		.32 P	.32 P		.32 P	V	V	V		S	
114			.32 P		.32 P	.32 P		.32 P	V	V	V		S	
115			.32 P		.32 P	.32 P		.32 P	V	V	V		S	
116			.16 P		.16 P	.16 P		.16 P	V	V	V		S	
117			.16 P		.16 P	.16 P		.16 P	V	V	V	5	11	Do.
118			.16 P		.16 P	.16 P		.16 P	V	V	V	4	9	Do.
119			.16 P		.16 P	.16 P		.16 P	V	V	V		S	
120									V	V	V		S	
121									V	V	V		S	Symptoms.
122									V	V	V	4	9	Poliomyelitis.
123									V	V	V	4	10	Do.

P = Picric acid.
S = Survived.

A second group of four monkeys was similarly handled, except that the picric acid was administered at intervals of 4 days, the last application being followed on the third, fourth, and fifth days by an intranasal instillation of virus. All survived without symptoms.

A third and fourth group were respectively identically handled as were groups 1 and 2, except that the concentration of picric acid was 0.16 rather than 0.32 percent. Two monkeys from each group died of poliomyelitis and the others survived without symptoms.

From the fifth group of four nonprepared control monkeys there were two deaths of poliomyelitis, while a third developed high fever and tremors but recovered, and one survived without symptoms.

All groups of the series were inoculated on the same day and with virus from the same 4 percent centrifuged suspension of several cords, the dose being 1 cc into each nostril repeated on 3 successive days.

It thus appears (table 5) that 0.16 percent picric acid was not sufficiently concentrated to be effective at 4- and 7-day intervals, while 0.32 percent was effective at 4-day intervals, but failed in one monkey treated at 7-day intervals. In this connection, it is to be remembered that no picric acid was administered subsequent to the virus applications. Such a continuation of the chemical applications, at the selected intervals, following the virus exposures would better have simulated any application of the method to the prevention of natural infection

through the periodic instillation of picric acid during a seasonal outbreak, and would possibly, judging from table 4, have improved the results.

SUMMARY

1. The instillation of various chemicals into the nostrils tends to prevent internasal infection of mice with encephalitis virus (St. Louis type) and of monkeys with poliomyelitis virus.

2. Picric acid, 0.32 to 0.64 percent either alone or combined with alum, was found to be superior to 4 percent alum and to be the most satisfactory and efficient experimental agent so far tried by the writers.

3. Picric acid in the concentration and amounts employed was devoid of detectable general or local injurious effects on animals. Sixteen applications sprayed by means of an atomizer into the nostrils of the authors produced no detectable injurious effects.

4. It is believed that picric acid exerts its protective effects locally, either by rendering the mucous membranes less permeable to infection or possibly by a direct action on the virus itself, or both.

5. The use of picric acid does not prevent the development of specific immunity in mice following a subsequent intranasal instillation of encephalitis virus.

6. Picric acid given to mice 1 and 2 days before, 1 and 2 days after, or on the same day as the virus instillation, led to a decreased susceptibility to the virus in all instances, as compared with nonprepared controls.

7. The protective effect of 0.32 percent picric acid is apparent against intranasally inoculated poliomyelitis for at least 4 to 7 days following its last administration.

8. Intranasally instilled chemicals effective in preventing encephalitis in mice have been found effective against poliomyelitis in monkeys, suggesting that the former may be utilized as an indicator in a further search for more effective prophylactic agents in the latter ailment.

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DEATHS DURING WEEK ENDED FEB. 8, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb. 8, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,580	9,424
Deaths per 1,000 population, annual basis	13.4	13.1
Deaths under 1 year of age	564	647
Deaths under 1 year of age per 1,000 estimated live births	51	59
Deaths per 1,000 population, annual basis, first 6 weeks of year	13.4	13.1
Data from industrial insurance companies:		
Policies in force	67,857,607	67,235,778
Number of death claims	14,405	13,845
Death claims per 1,000 policies in force, annual rate	11.1	10.7
Death claims per 1,000 policies, first 6 weeks of year, annual rate	10.6	11.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Feb. 15, 1936, and Feb. 16, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 15, 1936, and Feb. 16, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb 15, 1936	Week ended Feb 16, 1935	Week ended Feb 15, 1936	Week ended Feb. 16, 1935
New England States:								
Maine	1	1	5	9	324	349	0	0
New Hampshire			15		30	16	0	0
Vermont					271	3	0	0
Massachusetts	9	11			706	549	6	0
Rhode Island	1	1		2	58	17	0	0
Connecticut		1	12	21	122	620	0	0
Middle Atlantic States								
New York	37	42	[1] 69	[1] 24	1,807	1,391	20	3
New Jersey	10	11	17	17	70	407	5	3
Pennsylvania	48	52			640	3,004	9	4
East North Central States:								
Ohio	53	95	95	255	216	912	11	13
Indiana	36	35	45	113	9	562	3	5
Illinois	51	60	39	67	19	2,509	9	9
Michigan	4	9	8	31	27	895	1	4
Wisconsin	1	8	44	120	43	1,458	1	3
West North Central States:								
Minnesota	2	2	1	45	195	1,884	8	1
Iowa	7	10	4	87	14	1,462	12	3
Missouri	31	43	308	703	16	745	10	12
North Dakota	1	3	2	23	4	133	0	9
South Dakota	1				3	41	1	0
Nebraska	2	11			6	301	5	5
Kansas	15		47	40	15	1,300	0	6
South Atlantic States:								
Delaware		1		1	71	1	0	0
Maryland [2]	11	8	21	113	214	54	7	2
District of Columbia	18	9	3	1	21	7	4	3
Virginia	17	20			95	913	15	5
West Virginia	17	24	86	401	8	437	2	3
North Carolina	12	28	234	210	23	653	2	2
South Carolina	2	5	1,536	797	13	54	10	0
Georgia [2]	11	10	640	481			3	0
Florida	4	20	18	92	3	46	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 15, 1936, and Feb. 16, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935
East South Central States:								
Kentucky	15	14	62	99	68	679	13	2
Tennessee	9	16	245	515	15	67	16	14
Alabama	15	16	686	1,862	30	766	3	2
Mississippi [2,3]	3	8					2	3
West South Central States:								
Arkansas	9	3	57	80	2	22	2	2
Louisiana	25	41	48	24	40	94	3	0
Oklahoma [4]	8	13	207	437	3	84	17	5
Texas [3]	69	41	370	981	93	202	8	6
Mountain States:								
Montana	2		18	311	56	135	0	3
Idaho		2	6		14	68	1	0
Wyoming					3	16	2	0
Colorado	4	10		3	8	600	6	0
New Mexico	6	7	8	25	1	14	0	0
Arizona			151	81	22	17	3	0
Utah [3]					4	7	1	0
Pacific States.								
Washington	1			41	174	349	1	3
Oregon		2	67	173	767	102	2	0
California	28	56	3,890	306	1,529	530	10	8
Total	596	739	9,077	8,591	7,872	24,477	234	134
First 7 weeks of year	4,864	5,531	26,580	62,783	39,543	119,483	1,245	673

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935
New England States:								
Maine	0	0	14	29	0	0	0	0
New Hampshire	0	0	8	8	0	0	0	0
Vermont	0	0	31	11	0	0	0	0
Massachusetts	0	0	290	172	0	0	5	0
Rhode Island	0	0	19	15	0	0	0	0
Connecticut	0	0	67	65	0	0	0	0
Middle Atlantic States.								
New York	0	1	905	717	0	0	4	7
New Jersey	0	0	287	154	0	0	1	1
Pennsylvania	0	1	525	666	0	0	11	12
East North Central States:								
Ohio	1	3	473	1,225	1	1	2	5
Indiana	0	0	438	254	0	3	2	3
Illinois	1	2	668	948	14	1	3	11
Michigan	1	0	315	379	3	1	1	2
Wisconsin	0	1	454	627	25	18	1	2
West North Central States:								
Minnesota	0	1	361	97	4	0	1	0
Iowa	0	1	181	97	8	4	1	1
Missouri	1	0	186	155	4	2	12	2
North Dakota	0	0	74	68	1	0	0	1
South Dakota	0	0	54	9	12	3	0	1
Nebraska	0	0	184	41	20	78	1	0
Kansas	1	0	255	110	22	9	1	0
South Atlantic States:								
Delaware	0	0	6	14	0	0	1	0
Maryland [3]	0	0	90	85	0	0	1	1
District of Columbia	0	0	21	36	0	0	1	0
Virginia	0	3	43	74	0	0	6	13
West Virginia	0	0	35	155	0	0	2	5
North Carolina	0	0	30	42	1	0	7	1
South Carolina	0	0	4	3	0	0	0	0
Georgia [3]	0	0	25	19	0	0	0	3
Florida	0	1	6	13	0	0	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 15, 1936, and Feb. 16, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935	Week ended Feb. 15, 1936	Week ended Feb. 16, 1935
East South Central States:								
Kentucky	4	0	54	36	0	0	3	12
Tennessee	0	1	43	57	0	0	0	0
Alabama	1	1	19	14	0	0	1	4
Mississippi [2] [3]	0	0	13	9	0	1	2	5
West South Central States:								
Arkansas	0	0	14	15	0	1	1	2
Louisiana	2	0	25	26	0	0	1	16
Oklahoma [4]	0	0	35	23	1	3	3	4
Texas [3]	0	0	105	74	1	111	5	29
Mountain States:								
Montana	0	0	84	9	8	1	0	0
Idaho	1	0	59	7	10	0	1	1
Wyoming	0	0	119	3	4	3	0	1
Colorado	0	2	143	239	20	8	0	0
New Mexico	0	0	91	19	0	2	3	3
Arizona	1	0	24	29	0	0	0	0
Utah [2]	0	0	8[illegible]	82	0	0	0	0
Pacific States:								
Washington	1	1	89	52	17	37	0	4
Oregon	1	0	48	57	0	3	1	0
California	9	13	395	254	1	9	3	4
Total	25	32	7,444	7,293	177	299	88	157
First 7 weeks of year	162	198	50,141	45,206	1,599	1,492	806	1,037

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Feb. 15, 1936, 9 cases, as follows. Georgia, 2; Mississippi, 1; Texas, 6.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January 1936										
District of Columbia	19	154	14		24		0	96	0	12
Florida	6	46	21	48	6	1	0	58	0	5
Maine	1	6	50		921		5	75	0	1
Michigan	13	46	13		220		0	1,314	1	11
Nebraska	2	31	2		205		0	678	151	7
New Jersey	17	51	54	1	182		3	920	0	8
Ohio	42	152	232	1	543	1	2	1,641	10	13
Oregon	4	18	93		2,099	1	1	265	8	3
South Carolina		122	1,509	139	16	23		33	1	3
West Virginia	23	91	726		26		2	221	2	10

January 1936

Chicken pox:	Cases
District of Columbia	75
Florida	91
Maine	368
Michigan	2,507
Nebraska	199
New Jersey	1,773
Ohio	2,306
Oregon	242
South Carolina	72
West Virginia	350

Dengue:	Cases
Florida	1
South Carolina	2
Diarrhea:	
South Carolina	199
Ohio (under 2 years, enteritis included)	13
Dysentery:	
Florida (bacillary)	1
Michigan (amoebic)	1
New Jersey (amoebic)	1

Epidemic encephalitis:	Cases
District of Columbia	1
New Jersey	7
German measles:	
Maine	136
Michigan	47
New Jersey	80
Ohio	41
South Carolina	4
West Virginia	3

January 1936—Continued

	Cases
Hookworm disease: South Carolina	28
Impetigo contagiosa: Oregon	47
Lead poisoning:	
Michigan	4
Ohio	9
Mumps:	
Florida	76
Maine	1,405
Michigan	894
Nebraska	76
New Jersey	997
Ohio	1,117
Oregon	132
South Carolina	86
West Virginia	239
Ophthalmia neonatorum:	
New Jersey	1
Ohio	77
South Carolina	7
West Virginia	1
Paratyphoid fever: Michigan	1

	Cases
Puerperal septicemia: Ohio	5
Rabies in animals:	
New Jersey	16
Oregon	15
South Carolina	30
Scabies: Oregon	43
Septic sore throat:	
Maine	4
Michigan	39
Ohio	122
Oregon	18
Tetanus:	
Michigan	1
Ohio	1
Trachoma:	
New Jersey	1
Ohio	6
Trichinosis:	
Michigan	1
New Jersey	3
Tularaemia:	
Ohio	10
South Carolina	1

	Cases
Typhus fever:	
Florida	3
South Carolina	1
Undulant fever:	
Maine	1
Michigan	4
New Jersey	6
Ohio	4
Oregon	1
South Carolina	2
Vincent's infection:	
Maine	4
Michigan	21
Oregon	10
Whooping cough:	
District of Columbia	16
Florida	23
Maine	119
Michigan	1,403
Nebraska	34
New Jersey	480
Ohio	742
Oregon	36
South Carolina	70
West Virginia	52

CASES OF VENEREAL DISEASES REPORTED FOR DECEMBER 1935

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama [1]				
Arizona [1]				
Arkansas	145	0.77	117	0.62
California	1,406	2.28	1,270	2.06
Colorado [1]				
Connecticut	189	1.14	105	.63
Delaware	127	5.25	30	1.24
District of Columbia	93	1.87	109	2.19
Florida	279	1.77	75	.48
Georgia	692	2.38	224	.77
Idaho	0	0	0	0
Illinois	1,376	1.75	1,076	1.37
Indiana	128	.39	61	.18
Iowa [2]	90	.36	138	.56
Kansas	60	.31	40	.21
Kentucky	225	.85	229	.86
Louisiana [2]	307	1.42	77	.36
Maine	37	.46	41	.51
Maryland	849	5.08	210	1.26
Massachusetts	437	1.01	530	1.22
Michigan	494	.97	558	1.10
Minnesota	351	1.35	337	1.30
Mississippi	1,097	5.33	1,616	7.86
Missouri [1]				
Montana [2]	23	.43	37	.69
Nebraska	25	.18	48	.34
Nevada [2]				
New Hampshire	11	.23	3	.06
New Jersey	460	1.13	244	.58
New Mexico [2]	46	1.05	23	.53
New York [1]				
North Carolina	1,121	3.40	447	1.35
North Dakota	18	.19	49	.71
Ohio	458	.67	234	.34
Oklahoma [2]	127	.51	113	.46
Oregon	64	.65	120	1.21
Pennsylvania	[illegible]	.24	180	.18

See footnotes at end of table.

Reports from States—Continued

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Rhode Island	126	1.79	38	.54
South Carolina [2]	144	.82	193	1.10
South Dakota	13	.18	40	.57
Tennessee	866	3.24	355	1.33
Texas	80	.15	88	.14
Utah [3]	----------	----------	----------	----------
Vermont	16	.44	27	.75
Virginia [2]	202	.83	154	.63
Washington	169	1.05	194	1.21
West Virginia	144	.81	108	.60
Wisconsin [4]	27	.09	91	.30
Wyoming [3]	----------	----------	----------	----------
Total	12,785	1.22	9,629	0.92

Reports from cities of 200,000 population or over

Akron, Ohio	22	0.81	7	0.26
Atlanta, Ga	128	4.46	71	2.47
Baltimore, Md	581	7.04	110	1.33
Birmingham, Ala.[1]	----------	----------	----------	----------
Boston, Mass	160	2.02	203	2.57
Buffalo, N. Y	177	2.99	98	1.66
Chicago, Ill	806	2.26	717	2.01
Cincinnati, Ohio	37	.79	39	.84
Cleveland, Ohio	182	1.96	73	.78
Columbus, Ohio	48	1.57	26	.85
Dallas, Tex.[1]	----------	----------	----------	----------
Dayton, Ohio	13	.62	0	0
Denver, Colo	12	.40	3	.10
Detroit, Mich	179	1.03	215	1.24
Houston, Tex.[5]	126	3.76	33	.99
Indianapolis, Ind	18	.48	41	1.09
Jersey City, N. J	1	.03	1	.03
Kansas City, Mo	73	1.73	6	.14
Los Angeles, Calif	384	2.63	295	2.06
Louisville, Ky	284	8.77	162	5.00
Memphis, Tenn	194	7.27	56	2.10
Milwaukee, Wis	3	.05	17	.28
Minneapolis, Minn	87	1.79	90	1.85
Newark, N. J	144	3.11	95	2.05
New Orleans, La.[1]	----------	----------	----------	----------
New York, N. Y.[1]	----------	----------	----------	----------
Oakland, Calif	17	.56	34	1.12
Omaha, Nebr	8	.36	6	.27
Philadelphia, Pa	145	.73	53	.27
Pittsburgh, Pa	56	.82	40	.58
Portland, Oreg	42	1.34	76	2.42
Providence, R. I	56	2.16	23	.89
Rochester, N. Y	49	1.45	62	1.84
St. Louis, Mo	429	5.13	406	4.86
St. Paul, Minn	42	1.49	51	1.81
San Antonio, Tex.[3]	----------	----------	----------	----------
San Francisco, Calif	215	3.21	122	1.82
Seattle, Wash	119	3.13	116	3.06
Syracuse, N. Y.[6]	15	.69	30	1.38
Toledo, Ohio	38	1.25	21	.69
Washington, D. C.[7]	93	1.87	109	2.19

[1] No report for current month.
[2] Incomplete.
[3] Not reporting.
[4] Only cases of syphilis in the infectious stage are reported.
[5] Reported by the Jefferson Davis Hospital; physicians are not compelled to report venereal diseases.
[6] Reported by the Syracuse Free Dispensary.
[7] Reported by Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Feb. 8, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet-fever cases	Smallpox cases	Tuberculosis deaths	Typhoid-fever cases	Whooping-cough cases	Deaths, all causes
		Cases	Deaths								
Maine: Portland	0	------	0	0	4	1	0	0	0	5	19
New Hampshire:											
Concord	0	------	0	0	1	0	0	0	0	0	14
Manchester	0	------	0	0	2	1	0	0	0	0	14
Nashua	0	------	------	0	1	1	0	------	0	0	------
Vermont:											
Barre	0	------	0	0	0	0	0	2	0	0	5
Burlington	0	------	0	0	0	1	0	0	0	0	7
Rutland	0	------	1	9	0	8	0	0	0	0	10
Massachusetts:											
Boston	2	------	1	129	35	71	0	12	0	16	------
Fall River	1	------	1	0	5	7	0	2	0	2	40
Springfield	0	------	0	1	2	9	0	1	0	12	41
Worcester	0	------	0	0	7	21	0	1	0	1	51
Rhode Island.											
Pawtucket	0	------	0	0	0	1	0	0	0	0	------
Providence	1	------	1	12	6	9	0	2	0	3	75
Connecticut.											
Bridgeport	0	------	1	0	8	12	0	0	0	3	41
Hartford	0	------	1	1	4	5	0	4	0	5	49
New Haven	0	1	1	0	9	1	0	1	0	16	39
New York:											
Buffalo	0	------	1	25	17	56	0	8	0	9	145
New York	39	60	6	603	203	408	0	97	3	59	1,694
Rochester	0	------	0	0	3	5	0	3	0	1	67
Syracuse	0	------	1	59	6	10	0	1	0	12	42
New Jersey:											
Camden	1	1	0	1	1	6	0	0	0	0	32
Newark	0	5	1	1	13	85	0	5	0	12	111
Trenton	0	------	0	0	1	7	0	1	0	1	26
Pennsylvania:											
Philadelphia	7	5	4	237	44	89	0	26	1	62	539
Pittsburgh	8	5	3	22	37	59	0	7	0	21	208
Reading	0	------	0	1	1	2	0	1	0	0	27
Scranton	0	------	------	9	------	7	0	------	0	0	------
Ohio:											
Cincinnati	2	------	3	0	10	13	0	7	0	8	154
Cleveland	8	49	3	45	12	26	0	13	0	76	220
Columbus	0	4	4	1	9	19	0	2	0	1	112
Toledo	2	1	1	34	6	11	0	5	0	8	96
Indiana.											
Anderson	6	------	0	2	1	1	0	0	0	9	12
Fort Wayne	1	------	2	0	6	4	0	0	0	0	33
Indianapolis	1	------	1	1	20	28	0	4	0	25	121
Muncie	2	------	0	1	5	3	0	1	0	0	17
South Bend	0	------	0	1	4	1	0	0	0	1	23
Terre Haute	1	------	0	0	0	2	0	0	0	0	28
Illinois:											
Alton	1	------	0	0	0	0	0	0	0	0	10
Chicago	5	12	6	6	51	245	1	82	1	189	704
Elgin	0	------	0	0	1	4	0	0	0	0	14
Moline	0	------	0	0	2	12	0	0	0	0	9
Springfield	0	------	0	0	5	13	0	1	0	0	28
Michigan:											
Detroit	6	5	4	15	21	101	1	17	0	155	262
Flint	1	------	0	0	8	6	0	1	0	8	26
Grand Rapids	0	------	0	1	4	8	0	0	0	4	50
Wisconsin:											
Kenosha	0	------	0	0	0	6	0	0	0	3	8
Milwaukee	1	2	2	4	6	75	0	2	1	66	108
Racine	0	------	0	1	0	17	0	1	0	2	14
Superior	0	------	0	0	0	9	0	0	0	0	7
Minnesota:											
Duluth	0	------	1	1	0	4	0	6	0	1	28
Minneapolis	1	------	0	57	12	99	0	2	0	12	129
St. Paul	0	2	2	25	5	42	0	2	0	1	65

See footnotes at end of table.

City reports for week ended Feb. 8, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0	------	------	0	------	1	0	------	0	2	------
Davenport	0	------	------	0	------	14	0	------	0	0	------
Des Moines	2	------	------	0	------	6	0	------	0	1	31
Sioux City	0	------	------	1	------	6	5	------	0	0	------
Waterloo	1	------	------	1	------	0	0	------	0	0	------
Missouri:											
Kansas City	0	------	3	2	35	27	0	7	0	3	138
St. Joseph	0	------	1	0	3	4	0	1	0	0	21
St. Louis	11	------	1	1	23	41	0	11	0	1	251
North Dakota:											
Fargo	0	------	0	0	0	16	0	0	0	8	6
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	18	0	0	0	0	13
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	------	0	0	18	1	0	0	0	9
Nebraska: Omaha	0	------	0	1	5	81	4	0	0	0	55
Kansas:											
Lawrence	0	------	1	1	2	0	0	0	0	0	15
Topeka	0	------	2	0	2	0	0	0	0	0	13
Wichita	0	3	2	0	8	18	0	0	0	2	36
Delaware: Wilmington	0	------	0	1	3	0	0	1	0	7	34
Maryland:											
Baltimore	3	4	3	14	37	32	0	17	1	26	251
Cumberland	0	1	1	0	1	1	0	0	0	0	8
Frederick	0	------	0	0	0	0	0	0	0	0	4
District of Columbia: Washington	12	2	0	7	30	30	0	15	0	5	219
Virginia:											
Lynchburg	0	------	0	2	5	2	0	0	0	3	20
Norfolk	0	2	0	0	3	4	0	1	0	0	27
Richmond	1	------	2	0	12	6	0	3	0	0	78
Roanoke	0	------	0	1	3	0	0	0	0	0	22
West Virginia:											
Charleston	1	------	0	0	6	2	0	1	0	0	26
Huntington	0	------	------	0	------	2	0	------	0	0	------
Wheeling	1	------	0	0	0	0	0	0	0	0	16
North Carolina:											
Gastonia	0	3	0	0	1	0	0	1	0	0	13
Raleigh	0	------	0	0	4	0	0	0	0	0	16
Wilmington	0	4	0	0	0	0	0	0	0	0	8
Winston-Salem	0	------	0	22	2	2	0	3	0	0	16
South Carolina:											
Charleston	0	395	1	0	12	0	0	3	0	1	32
Columbia	0	------	0	0	8	0	0	0	0	0	19
Florence	0	------	0	0	1	0	0	0	0	0	13
Greenville	0	------	0	26	1	0	0	1	0	0	10
Georgia:											
Atlanta	1	76	5	0	8	8	0	7	0	0	105
Brunswick	4	------	0	0	0	1	0	0	0	0	4
Savannah	0	67	4	0	3	1	0	1	0	2	30
Florida:											
Miami	0	------	0	0	4	1	0	5	1	3	45
Tampa	1	1	1	0	9	2	0	1	0	0	26
Kentucky:											
Ashland	1	------	0	0	1	0	0	1	0	0	2
Covington	1	------	0	0	5	4	0	1	0	0	25
Lexington	2	------	0	0	8	0	0	2	0	0	26
Louisville	2	12	1	1	10	3	0	3	0	10	68
Tennessee:											
Knoxville	1	------	4	11	5	1	0	2	0	0	33
Memphis	1	------	3	2	10	5	0	5	0	10	93
Nashville	0	------	5	0	13	3	0	2	0	0	63
Alabama:											
Birmingham	0	30	2	0	10	5	0	5	0	0	75
Mobile	0	3	1	0	2	2	0	0	0	0	32
Montgomery	1	4	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	1	------	------	0	------	0	0	------	0	0	------
Little Rock	5	------	1	0	3	5	0	1	0	0	------
Louisiana:											
Lake Charles	0	------	0	0	2	0	0	0	0	0	7
New Orleans	10	1	3	11	14	10	0	6	0	6	156
Shreveport	0	------	0	14	8	1	0	1	0	0	47

See footnotes at end of table.

City reports for week ended Feb. 8, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	3	4	4	18	13	7	0	5	0	1	78
Fort Worth	2	------	1	0	6	5	0	3	0	0	51
Galveston	4	------	1	0	2	3	0	2	0	0	19
Houston	11	------	1	18	16	5	0	3	2	1	88
San Antonio	1	------	3	1	14	8	0	3	1	0	72
Montana:											
Billings	0	------	0	0	1	14	0	0	2	1	6
Great Falls	0	------	0	0	1	15	0	0	0	2	7
Helena	------	------	------	------	------	------	------	------	------	------	------
Missoula	0	------	0	0	0	2	0	0	0	0	3
Idaho: Boise	0	------	0	1	1	9	0	0	0	0	6
Colorado:											
Colorado Springs	0	------	0	3	3	9	1	1	0	1	15
Denver	2	------	1	6	12	21	0	6	0	7	90
Pueblo	0	------	1	0	2	20	0	0	0	0	18
New Mexico: Albuquerque	0	1	0	0	3	12	0	2	0	9	18
Utah: Salt Lake City	0	------	1	2	1	84	0	0	0	10	25
Nevada: Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	24	3	24	0	4	2	0	113
Spokane	0	------	0	4	1	7	0	1	0	4	29
Tacoma	0	------	0	4	6	5	0	0	0	0	40
Oregon:											
Portland	1	2	1	279	6	13	0	2	0	5	90
Salem	0	------	------	5	------	0	0	------	0	0	------
California:											
Los Angeles	7	49	2	206	25	90	0	20	1	27	357
Sacramento	4	7	2	12	3	13	0	2	0	12	29
San Francisco	1	28	7	294	22	85	0	10	0	9	208

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	1	0
Worcester	1	0	0
New York. New York	18	11	0
New Jersey: Newark	1	0	0
Pennsylvania: Pittsburgh	0	1	0
Ohio:			
Cleveland	1	1	0
Columbus	2	0	0
Toledo	0	1	0
Indiana: Indianapolis	0	1	0
Illinois: Chicago	8	1	0
Minnesota: Minneapolis	1	0	0
Iowa: Des Moines	1	0	0
Missouri:			
Kansas City	3	0	0
St. Joseph	2	0	0
St. Louis	3	2	2
Nebraska: Omaha	1	0	0
Kansas: Wichita	0	0	1

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Delaware: Wilmington	0	1	0
Maryland: Baltimore	10	1	0
District of Columbia: Washington	4	2	1
South Carolina:			
Charleston	1	1	1
Greenville	0	1	0
Georgia. Atlanta	1	0	0
Tennessee:			
Knoxville	1	0	0
Memphis	4	2	0
Arkansas: Little Rock	1	0	0
Louisiana: Shreveport	1	2	0
Texas:			
Houston	3	0	0
San Antonio	1	1	0
Colorado: Colorado Springs	0	0	1
Washington: Seattle	1	1	0
Oregon: Portland	1	0	0
California: Los Angeles	1	1	2

Epidemic encephalitis.—Cases: Columbus, 1; Chicago, 1; Kansas City, Mo., 1.

Pelagra.—Cases: Charleston, S. C., 1; Tampa, 1; New Orleans, 1; Dallas, 1; Los Angeles, 1; San Francisco, 3.

Rabies in man.—Deaths: Greenville, S. C., 1.

Typhus fever.—Cases: Boston, 1; Worcester, 1; Flint, 1.

FOREIGN AND INSULAR

CEYLON

Mortality.—From November 1934 to October 1935 more than 100,000 deaths from malaria and allied causes occurred in Ceylon. During the same period a total of 214,224 deaths from all causes were reported, as compared with 113,640 deaths for the previous 12 months.

The following table shows the mortality figures by months since the malaria epidemic began in November 1934, as compared with the previous 12 months.

Deaths reported from all causes

	1934	1933		1934	1933
November	12,198	9,447	December	19,728	9,049
	1935	**1934**		**1935**	**1934**
January	36,252	11,541	July	16,236	9,476
February	28,552	9,964	August	14,309	9,967
March	19,065	9,105	September	10,895	8,540
April	15,931	8,786	October	10,913	9,910
May	16,693	9,116			
June	15,452	8,739	Total	214,224	113,640

ITALY

Communicable diseases—4 weeks ended December 8, 1935.—During the 4 weeks ended December 8, 1935, cases of certain communicable diseases were reported in Italy as follows:

Disease	Nov. 11-17		Nov. 18-24		Nov. 25-Dec. 1		Dec. 2-8	
	Cases	Communities affected	Cases	Communities affected	Cases	Communities affected	Cases	Communities affected
Anthrax	30	28	24	22	17	17	17	17
Cerebrospinal meningitis	7	7	6	6	9	8	5	5
Chicken pox	222	107	245	122	288	107	304	118
Diphtheria and croup	717	343	796	379	730	370	766	368
Dysentery	11	10	12	11	7	7	16	12
Hookworm disease	9	8	5	4	9	7	10	6
Lethargic encephalitis			1	1	1	1	1	1
Measles	1,189	197	1,317	207	1,210	209	1,139	220
Paratyphoid fever	120	76	78	53	91	68	73	58
Poliomyleitis	20	15	25	20	22	19	19	14
Puerperal fever	48	46	41	36	47	47	32	32
Rabies	1	1						
Scarlet fever	685	269	649	252	590	233	514	208
Typhoid fever	688	388	552	301	531	301	444	251
Undulant fever	21	18	23	17	14	14	21	19
Whooping cough	193	74	248	89	330	76	261	81

LATVIA

Notifiable diseases—October–December 1935.—During the months of October, November, and December, 1935, cases of certain notifiable diseases were reported in Latvia as follows:

Disease	October	November	December	Disease	October	November	December
Anthrax	1			Paratyphoid fever	25	37	11
Cerebrospinal meningitis	6	7	5	Poliomyelitis	8	3	3
Diphtheria	70	80	87	Puerperal septicemia	8	3	2
Erysipelas	23	22	25	Scarlet fever	176	260	241
Influenza	65	53	75	Tetanus	1	1	
Leprosy	2	1	1	Trachoma	26	42	72
Measles	8	60	74	Tuberculosis	308	333	294
Mumps	5	4	15	Typhoid fever	64	48	23
				Whooping cough	9	30	22

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept 1–28, 1935	Sept. 29–Oct. 26, 1935	Week ended— November 1935 2	9	16	23	30	December 1935 7	14	21	28	January 1936 4	11	18	25
China: Amoy	C	1																
India	C	25,494	57,713	51,707	29,882	6,397	4,496	5,553	4,302	4,890	3,355	4,620	1,619					
	D	13,286	29,945	24,303	15,089	3,239	2,246	2,980	2,258	2,627	1,850	2,401	839					
Assam	C	250	1,706	585	164	54	74	125	198	207	204	154	211	138	72	77	120	40
	D	146	871	236	79	29	30	62	123	112	103	104	109	80	46	39	62	20
Bombay Presidency	C	1,328	6,236	7,779	3,318	559	477		510	346	387	357	148	49	74	149		
	D	528	2,687	3,328	1,510	252	195		249	181	183	165	67	30	44	75		
Bombay	C	7	6	3				[1] 1										
Calcutta	C	522	216	119	90	22	19	40	33	30	24	29	38	12	15	28	57	40
Central Provinces and Berar	C	3,732	7,243	11,774	5,775	536	487	196	102	30	47	40	6	5	13	1		
Chittagong	C	8	7				1											
Cochin	D		1	11	9													
Madras Presidency	C	2,972	7,487	8,185	4,648	1,108	963	894	1,052	1,273		1,311	1,004	540	212	186		
	D	1,264	3,249	3,482	2,114	502	486	408	501	630		625	454	257	96	94		
Madras	C	84	137	31	8			1	7	4	3	5	4	1		2	3	4
	D	23	57	15	1				1	3	4	2	1				1	
Moulmein	C		1															
Negapatam	C												4	3	3	7	5	7
	D												2	2	2	4		2
Northwest Frontier Province	C		80	338	12												1	
	D		36	174	11													
Punjab	C	252	516	302	154	23	1							7		1		
Rangoon	C	3				[1] 1									[1] 1			
Vizagapatam	C		1															
India (French):																		
Chandernagor	C	7	16	1														
Karikal	C				4	1				11								
Pondichery	C	2	39	83	16	1				4								
Indochina (see also table below): Pnom-Penh	C		1		1													

[1] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Week ended— November 1935					December 1935				January 1936			
						2	9	16	23	30	7	14	21	28	4	11	18	25
Philippine Islands:																		
Occidental Negros Province	C		1															
	D		1															
Rizal Province	C		1															
Siam:																		
Ang Thoang Province	C				10	1			1	1								
	D				9	1			1	1								
Ayudhaya Province	C			46	30	5	8	8	4			11	17	12	17	9	28	26
	D			31	25	4	7	4	1			6	19	10	11	6	16	16
Bangkok	C		1	43	44	10	13	18	18	18	16	5	14	14	17	21	39	47
Bejrpuri Province	C		13	14	14				3						1	9	20	26
Chhaxoengsao Province	C											3	25	27	14	60	57	44
Jalapuri Province	C													3	6	1	8	5
Kanchanapuri Province [1]	C	6	9															
Lobpuri Province	C												9	1				
Nagara Pathom Province	C				11	6	12	3	4		1				3	1		
Nondpuri Province	C			2	8			6	6	7	3				1		2	4
Prachinpuri Province	C									14	17	9	4	24	5	7	12	2
Pradumdhani Province	C				6	1			1		1					1		3
Rajpuri Province	C		72	107	18	6	8	2	11	9	16	10	16	12	24	29	10	
Sarapuri Province	C				6	13	2	1	1							2		
Singhapuri Province	C				11	10	1	4						2		1		
Smudprakar Province	C			5	5	2		3		1	8		20	21	5	1	6	3
Smudsagara Province	C		7	9	9	1	1	1		4	11	4	1	20	8	25	16	9
Smudsongram Province	C		51	56	23	2	11	11	7	3	6	7	12	13	16	12	8	13
Subarnpuri Province	C						12	1	3	2								
On vessels:																		
S. S. *Santhia* at Rangoon from Calcutta	C	1																
S. S. *Kuala* at Penang from Moulmein	C	1																
S. S. *Cape St. Francis* at Rangoon from Calcutta	C	1																
S. S. *Cape St. Andrew* at Calcutta	C	1																

[1] During the period Apr. 20 to July 9, 1935, 98 cases of cholera with 95 deaths were reported in Kanchanapuri Province, Siam.

Place		August 1935			September 1935			October 1935			November 1935			December 1935		
		1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31
Indochina (French) (see also table above):																
Cambodia [3]	C								1				1			
	D			4					1							
Cochin-China [3]	C			3		1			1			1	1		2	1
	D			2		1			1			1			2	1

[3] Reports incomplete.

PLAGUE [1]

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Week ended—												
						November 1935					December 1935				January 1936			
						2	9	16	23	30	7	14	21	28	4	11	18	25
Algeria: Philippeville	C				3													
Argentina (see also table below):																		
Pampa Territory—Leventue.[2]																		
San Luis.[3]																		
Azores. (See table below.)																		
Belgian Congo	C	3	2	2	1													
Plague-infected rats					3													
Bolivia. (See table below.)																		
Brazil.[4]																		
British East Africa:																		
Kenya	C	21	26	33	10	2	2	1	1	1	3	19	1	2	4	1		
Tanganyika	C																	7
Uganda	C	240	231	188	206	49	50	56	69	57	25	21		15	6	7	19	
	D	215	226		188	46	40	35	59	51	20	19		15	5	6	18	

[1] Including plague in the United States and its possessions.
[2] A report dated Aug. 8, 1935, states that 4 cases of plague occurred at Leventue, Pampa Territory, Argentina, during 2 months.
[3] A report dated Aug. 2, 1935, stated that plague-infected rats were present at San Luis, Argentina.
[4] Reports of plague in Brazil have been received under the dates indicated, as follows: July 25, 1935, 4 cases at Vicosa, Alagoas State: July 2, about 16 deaths in Fiera Santanna, Bahia State, since Jan. 1; Oct. 15, 7 cases near Bomfim, Bahia State, during September; during October 1935, 3 cases at Tanguinho, Santa Barbara, Bahia State; July 25, 10 cases in Ceara State since Jan. 1; Sept. 10, 204 cases with 72 deaths in Pernambuco State up to Aug. 24; Oct. 8, 4 cases and 1 death at Paulista, Piauhy State; Nov. 1–30, 7 cases near Feira, Bahia State; Dec. 1–31, 20 cases near January Catuny, Bahia State.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Week ended— November 1935 2	9	16	23	30	December 1935 7	14	21	28	January 1936 4	11	18	25
Ceylon:																		
Balapitiya	C								1									
Colombo	C	5	4	11	6			2	1	2	2	4	3	2	3	2	2	3
	D	5	4	8	6			1	1	2	2	4	2	2	3	2	2	2
Plague-infected rats		3			14	6	17		2	2		1	3					
Ratnapura	C				1													
Tellijjawilla	C				1													
China (see also table below):																		
Fukiang Province—Chuanchow.[5]																		
Manchuria.[6]																		
Dutch East Indies: West Java	C	591	670	868	769	215												
	D	588	668	866	769	214												
Ecuador:																		
Duran	C				1													
Guayaquil	C		3	8	35	7	9	5	17	10	13	2	5			3	4	1
	D			3	15	1	2	3	5	5	1		2	1		1	3	2
Plague-infected rats					8	1	2		4	5			4	1	1	1		
Loja Province—Celica	C	1																
Nobol	C				1													
Egypt:																		
Alexandria—Plague-infected rats		P	P	P	P		P		P		P			P		P		
Asyut Province	C	2	1					1				1	2		1	2	2	1
Girga Province	C																	
Qena Province	C				1												1	
Great Britain—England—Liverpool—Plague-infected rats											2							
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district—																		
Hamakua Mill										1				1				
Kalopa		3	1															
Kukaiau					1	2					1							
Paauhau				1	2										1			
Paauilo		1																
Pohakea Sector.[7]																		
Maui Island—Makawao district—Kahului (9–10 miles from)			2	1														

India	C	176	947	1,432	2,635	451	655	653	649	723	481	514	419					
	D	111	483	633	1,228	181	184	201	204	249	196	249	214					
Bassein	C	4	1	3	1							1						
Plague-infected rats		3	1							1								
Bombay Presidency	C	68	162	163	363	33	71		30	14	34		37	17	15	32		
	D	36	79	94	234	22	46		20	5	12		22	14	8	22		
Bombay	C																	[8] 1
Central Provinces and Berar	C	6	255	483	464	229	351	323	366	382	208	272	119	117	55	137		2
Madras Presidency	C	9	49	111	121	19	25	27	37	25		28	43			7		
	D	2	21	46	73	19	16	14	22	17		21	30			4		
Punjab	C			4			11	9	12	16								
	D						5	3	3	10								
Rangoon	C	8	6	1	1						[8] 1							
Plague-infected rats		2	1	1	1						1							
Indochina (see also table below):																		
Pnom-Penh	C																	1
Saigon-Cholon	C		2															1
Iraq: Baghdad	C	2	3	1				1				1			[8] 1			
Libya: Provinces of Tripoli—Tagiura	C	1																
Madagascar. (See table below.)																		
Morocco:																		
Draa boundaries—Tighmert	C	7																
Mogador	C	9																
	D	3																
Peru. (See table below.)																		
Senegal. (See table below.)																		
South-West Africa. (See table below.)																		
Tunisia: Tunis	C	2	2	10	2				1									
	D	1		2					1									
Plague-infected rats			1						1									
Union of South Africa	C	7	4	8	18		[9] 2		[9] 5		[9] 2		[9] 5		[9] 24		[9] 20	
Cape Province	C										1	1						
Orange Free State	C									1	1							
United States:																		
California—Plague-infected ground squirrels:																		
Lassen County		1																
Montana—Dillon—Plague-infected ground squirrels		1																
Oregon—Plague-infected ground squirrels:																		
Grant County		7																
Wallowa County		[10] 8																
On vessel: S. S. *Ipanema* at Marseille	C				[11] 2													

[5] A report dated July 4, 1935, states that 76 cases of plague with 58 deaths were reported at Chuanchow, Province of Fukiang, China. Plague was also present at Lungyen.

[6] A report dated Oct. 28, 1935, states that up to Oct. 23, 155 deaths from plague were reported in the provinces of Kirin, Lungkiang, Fengtien, and South Hsingan, Manchuria China. A report dated Nov. 27, 1935, stated that 23 deaths from plague had occurred in the vicinity of Koshan, and that there were about 15 cases in Harbin.

[7] During the week ended Feb. 15, 1936, 1 plague-infected rat was reported at Pohakea Sector, Hamakua District, Island of Hawaii, Hawaii Territory.

[8] Imported.

[9] For 2 weeks.

[10] Includes 1 suspected plague-infected squirrel.

[11] One of these cases was a member of the crew and the other was a stevedore believed to have worked on the vessel. Several plague-infected rats were reported found on board the vessel.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		July 1935	August 1935	September 1935	October 1935	November 1935	December 1935
Argentina (see also table above):							
Cordoba Province	C						5
Jujuy Province	C	1					
Azores	C		3	4	2	2	
Basutoland	C						16
Belgian Congo	C	3					
Bolivia	C		[13] 4				
Indochina (see also table above):							
Cambodia	C			1			
Cochinchina	C		1			1	
Madagascar (central region)	C	112	138	232	293	345	
	D	102	133	227	282	333	
Peru	C	4	10	3	1	14	9
Catamarca Department	C					13	
Lambayeque Department	C						1

Place		July 1935	August 1935	September 1935	October 1935	November 1935	December 1935
Peru—Continued.							
Libertad Department	C	2		1	1	1	
Lima Department	C	2	5	2		10	7
Callao	C		3				
	D		2				
Lima	C	1	5				
	D		2				
Senegal:							
Baol [13]	C		16	8			
Dakar [13]	C	25	2				
	D	15	1				
Rufisque [13]	C	2	4				
Theis [13]	C	17	22				
Tivaouane [13]	C	42	46	11	1	1	1
South-West Africa: Ovamboland [14]	C	[15] 24					

[12] Suspected. [13] Incomplete reports. [14] From the beginning of 1935 up to Sept. 30, 185 cases of plague were reported in Ovamboland, South-West Africa. [15] For 2 months.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Week ended— November 1935: 2	Nov. 9	Nov. 16	Nov. 23	Nov. 30	December 1935: 7	Dec. 14	Dec. 21	Dec. 28	January 1936: 4	Jan. 11	Jan. 18	Jan. 25
Algeria: Algiers Department	C	1		5														
Argentina.[1]																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil:																		
Porto Alegre (alastrim)	C	29	44															
Santos	C			2														

British East Africa:																		
Kenya	C	2	7															
Tanganyika	C	96	59	36	6	9		8		1								
Uganda	C																8	
British Guiana.[2]																		
British Somaliland	C	16	3	25	4	1	1	1			2	1		4	2	1	1	
British South Africa:																		
Northern Rhodesia	C			1														
Southern Rhodesia	C				1													
Canada:																		
Alberta	C		[3] 1							[3] 1						[3] 1		
British Columbia	C		[3] 1	5	[3] 1	[3] 1						1		1			1	1
Manitoba	C	[3] 1																
Ontario	C	3																
Quebec	C	2																
Saskatchewan	C				[3] 3			[3] 1										
Canary Islands: Santa Cruz de Tenerife	C		1															
Chile: Chuquicamata	C	[4] 1	1															
China:																		
Amoy	C	2	1															
Dairen	C	8	2															
Foochow	C	P	P	P	P	P		P		P		P						
Hangchow	C	1												1				
Hong Kong	C							1	1									
Nanking	C	3				3		9	6	8	19	5	5	14	1			
Shanghai	C	2	5	1	2	1		1		2	1	2		3	1	1	2	
Swatow	C			1		1		2			1							
Tientsin	C		1								1	1		1				
Tsingtao	C		1															
Chosen. (See table below.)																		
Colombia	C		3	111			[5] 25	1		18		14	15	3	7	11		
Bogota	C		10				[5] 1			7	3							
Dahomey. (See table below.)																		
Eritrea	C		5	14	7													
Asmara	C				4													
France. (See table below)																		
Greece: Salonika	C		8	6				2	2							2		
Guatemala. (See table below)																		
Honduras. Tela	C	P			2													
India	C	13,440	10,576	5,530	4,147	1,207	1,337	1,731	1,970	2,397	2,038	2,946	2,235					
	D	3,320	2,735	1,256	865	225	265	346	418	508	450	616	422					
Assam	C	6	100	19	10	2		2	3	10	43	26	47	52	38	18	22	37
Bassein	C															[4] 1		
Bombay Presidency	C	2,273	1,678	748	487	117	178		152	188	183		363	195	279	542		
	D	471	363	133	65	9	18		32	31	32		38	33	67	79		
Bombay	C	402	54	24	11	2	6	2	5	6	8	6	6	10	13	22	18	33
	D	69	33	15	4	1	3	2	1	5	7	2	5	7	8	15	9	17

[1] A report dated Oct. 25, 1935, states that 19 cases of smallpox have been reported in Entre Rios Province, Argentina.
[2] A report dated July 6, 1935, states that 57 cases of smallpox with 1 death were reported in British Guiana.
[3] For 2 weeks.
[4] Imported.
[5] For 6 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Week ended— November 1935: 2	9	16	23	30	December 1935: 7	14	21	28	January 1936: 4	11	18	25
India—Continued.																		
Calcutta	C	56	53	24	13	2	2	4	2	9	7	13	27	41	49	105		116
	D	40	27	15	5	2	2	2	1	5	3	9	14	30	29	45		59
Central Provinces and Berar	C	651	340	114	380	36	51	54	167	167	155	273	214	136	125	386	340	415
Chittagong	D																1	
Cochin	C				5	1												
Karachi	C	7	7	1	2		1	1	1			1	9	[4] 1		7	9	1
Madras Presidency	C	2,615	3,465	2,246	1,664	394	358	325	371	363		440	527	72	20	76		
	D	402	573	401	339	66	62	61	69	66		76	93	32	4	6		
Madras	C	10	10	10	1	3		1		3	3		2		1	2		
Moulmein	C	6	18	5		1			1		2			4	1		6	20
Negapatam	C	6	17	3	2										2			1
Northwest Frontier Province	C	9	6	2				9			2	3	1	1	4	11		11
Punjab	C	168	72	79	99	40	41	46	107	102	73	96	82	62	148	83	118	149
Rangoon	C	16	8	2	1		[4] 1				[4] 1	[4] 1	2			[4] 2	1	[4] 6
Tuticorin	C	19	25	12	11	3							5					
Vizagapatam	C	14	14	14	18	1		1	2	2		1	5	3	4	10	15	7
India (French):																		
Chandernagor	C	3	4	5	4					44								
Karikal	C	21	44	12	25					1								
Pondichery	C	50	51	22	11					3								
	D	41	39	24	8					3								
Indochina (see also table below): Haiphong	C	2	1															
Iran	C		2	3	19		1	2			3		5	4	8			
Teheran	C	1		2	3													
	D			1	1													
Iraq	C		9		11				7	1	9	17	4	6	7	20	28	8
Arbil	C		1															
Baghdad	C					1			1							1		
Basra	C				1			1										
Italian Somaliland	C									2								
Japan:																		
Kawasaki	C	1																
Mizuna Migifu Prefecture.[6]																		

Libya: Tripolitania	C														2			
Lithuania	C	1																
Mexico (see also table below):																		
Chihuahua	C							[7] 1										1
Guadalajara	D	2	1	2	1	1	3	2	2	1	3	1	4	6	4	5	4	
Mazatlan	C									1								
Mexico, D. F.	C	32	51	19	3	2	5	3		2	2	1	2					
Monterey	C				1			1										
San Luis Potosi	D	2	2	4														
Torreon	C					1			3	1	1				1			
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	472	124	290	280		[3] 17		[3] 129		[3] 74		[3] 352					
Niger Territory. (See table below.)																		
Nyasaland. (See table below.)																		
Oman	C														750			
Peru. (See table below.)																		
Poland	C	1	1							1								
Portugal (see also table below):																		
Lisbon	C	1	2	2	3	1		2	2		5		1	2	1	2		
Oporto	C	2																
Salvador. (See table below.)																		
Saudi Arabia	C	7	1			2	2											
Siam: Bangkok	C	6																
Sierra Leone	C	47	344	288	110		[3] 176		[3] 46		[3] 38		[3] 78					
Freetown	C	6	3	2	7						2							
Spain	C	38	13	12	7	1								1	3	9	7	1
Straits Settlements: Singapore	C	16	12	1														
Sudan (Anglo-Egyptian)	C	2	7						2						3			
Syria: Tripoli	C				1													
Turkey. (See table below.)																		

On vessels:
S. S. *Chitose Maru* at Nagasaki from Dairen .... 2 cases .... July 2, 1935
S. S. *Perala* at Aden from Massawa .... 1 case .... July 13, 1935
S. S. *Englistan* at Rangoon from Gopalpore .... 1 case .... July 30, 1935
S. S. *Hong Kheng* at Singapore from Amoy .... 2 cases .... Aug. 1, 1935
S. S. *Barenjels* at Gibraltar .... 1 case .... Aug 23, 1935
S. S. *Talamba* at Rangoon from Madras .... 1 case .... Sept. 9, 1935

On vessels—Continued.
S. S. *Ethiopia* at Rangoon from Madras .... 1 case .... Oct. 4, 1935
S. S. *Ekma* at Rangoon from Calcutta .... 1 case .... Dec. 10, 1935
S. S. *Cape St. Francis* at Rangoon from Calcutta .... 1 case .... Dec. 17, 1935
S. S. *Bankura* at Karachi .... 1 case .... Jan. 4, 1936
S. S. *Matua* at Suez from Calcutta .... 1 case .... Jan. 21, 1936

[3] For 2 weeks.
[4] Imported.
[6] A report dated June 11, 1935, stated that 10 deaths from smallpox had occurred in Mizuna Migifu Prefecture, Japan
[7] For 3 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths: P, present]

Place		July 1935	August 1935	September 1935	October 1935	November 1935	December 1935
Belgian Congo	C	197	261	303	248		54
Bolivia	C	47	30	57	23		
China: Manchuria—Harbin	C				1		
Chosen	C	47	32	16	53	53	
Dahomey	C	7	2	3		31	
France	C	60	1	6	16	7	18
Guatemala	C			4		1	
Indochina (see also table above)	C	203	138	103	98	66	44
	D	31	30	16	12	10	3
Mexico (see also table above):							
Aguascalientes State:							
Aguascalientes	C	3					
Campeche State	C	1					
Guanajuato State	C	4	2				
Leon	C	2	2				
Jalisco State	C	10	1				
Guadalajara	C	2	1				
Lower California	C	3					
Mexico State	C	1					

Place		July 1935	August 1935	September 1935	October 1935	November 1935	December 1935
Mexico (see also table above)—Cont.							
Mexico, D. F.	C	54	35				
Mexico City	C	41	31	2			
Oaxaca State	C		23				
Puebla State:							
Puebla	C	2	1				
San Luis Potosi State	C	5	5				
San Luis Potosi	C	3	5				
Vera Cruz State	C		3				
Vera Cruz	C		1				
Morocco	C	5		1			
Mozambique	C		2	87	15	1	
Niger Territory	C	174	209	111	127		
Nyasaland	C	35	11	14	24		
Peru	C	10	154	141			
Portugal (see also table above)	C	38		52	154		
	D	2		9	34		
Salvador	C	35	2			36	12
Turkey	C	9			1		

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28, 1935	Week ended— October 1935: 5	12	19	26	November 1935: 2	9	16	23	30	December 1935: 7	14	21	28	January 1936: 4	11	18
Algeria:																				
Algiers Department	C	18	1	1			1			1										1
Algiers	C																	1		
Constantine Department	C	36	3	4	1	3	1			1								3	18	
Bone	C			2															1	
Constantine	C			1		1												2	1	
Philippeville	C	2																		
Oran Department	C	17																		
Australia:																				
Queensland	C	2	1																	
Sydney	C											1	1							
Basutoland	C	11																		
Belgian Congo	C					1														
Bolivia. (See table below.)																				
Bulgaria	C			1																
Chile	C	282	397	285				[1] 473			[2] 460									
Concepcion	C	16	52	32				[1] 21												
Santiago [3]	C	111	245	172				[1] 333												
Valparaiso	C	1	8	24	3		10	13	25	2	17		12	6	15	10	6	3	2	
China:																				
Canton	C										2									
Hankow	C	2	1	1	1	1	1				1									
Harbin [4]																				
Hong Kong	C			1																
Nanking	C								1											
Shanghai	C	2	1												1	1	1			
South Manchuria Railway Zone	C			2								4								
Tientsin	C									1										
Tsingtao	C	1	6	7												3				
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				

[1] For 4 weeks.
[2] For 2 weeks.
[3] A report dated Jan. 20, 1936, states that there were 305 cases of typhus fever with 58 deaths in Santiago Province, Chile, from Nov. 2–16, 1935.
[4] A report dated June 25, 1935, states that about 400 cases of typus fever occurred at Harbin, Manchuria, China.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28, 1935	Week ended— October 1935: 5	12	19	26	November 1935: 2	9	16	23	30	December 1935: 7	14	21	28	January 1936: 4	11	18
Egypt:																				
Alexandria	C	4												1					1	
Asyut Province	C	3	4					1			1									
Beheira Province	C	19	9	2	7	2		1			5	6		8		4			22	
Beni-Suef Province	C	1	1																	
Cairo	C	1	1	1																
Dakahliya Province	C	2	1																	
Damietta	C			1																
Faiyum Province	C										1									
Gharbiya Province	C	36	16	2							1								6	
Girga Province	C		1									1								
Minufiya Province	C	20	1	1																
Minya Province	C	2	3																	
Port Said	C	2	2	1																
Qena Province	C										1									
Sharkiya Province	C	4	1																	
Suez	C											1								
Provinces	C	98	41	18	7	3	1	3	1	1	10	8	6	13	9	4	15	40	35	
France. (See table below.)																				
Greece: Salonika (see also table below)	C												1	1	1	1	1	1		
Guatemala. (See table below.)																				
Hawaii Territory—Honolulu	C	1	1			2		4					1	1						
Hungary	C																		3	
Iran	C	29	29	21		2	2	1		2		3	2		1	1		2		
Teheran	C	14	1	3			2											1		
Iraq	C														17				19	
Baghdad	C		1																	
Basra liwa	C			1																
Irish Free State: Waterford County: Youghal District No. 2	C											1								
Japan: Tokyo	C	1																		
Latvia. (See table below.)																				
Lithuania	C	12	6	3							1		[2] 18					12		[2] 17

Mexico (see also table below):																				
Guadalajara	D	1																		
Mexico, D. F.	C	94	142	134		30	20		23	15	8	7	7	16	24	28				
Torreon	D			2																
Morocco (see also table below)	C	62	19	3			1		7				1	1	8		3	2	3	3
Palestine: Haifa	C	3	[4] 7	[4] 11	1	3	1	3	4	4	1	1	1					2		
Panama Canal Zone. (See table below.)																				
Paraguay: Asuncion	D	1																		
Peru. (See table below.)																				
Poland	C	175	120	56	29	30	28	22	23	23	24	34	55	59	63	73	35	55	96	100
	D	10	10	2	2		1	1	2		2	2	2	5	6	6	5	6	6	6
Portugal. (See table below.)																				
Rumania. (See table below.)																				
Straits Settlements: Singapore	C		2	1		1				1				1			1	1		
Trans-Jordan	C		1	2	1	1														3
Tunisia:																				
Tunis	C	1	1	4	1			1	1					1						3
Provinces	C	88	56	18	1		1	11	2	1	1		2	4		20	7	12	34	10
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: S. S. *Agamemnon* at London	C			1																

Place		July 1935	August 1935	September 1935	October 1935	November 1935	December 1935
Bolivia	C	114	150	140	88		
China: Manchuria—Harbin	C				1	3	
Chosen	C	40	31	17	20	30	
Czechoslovakia	C	33	3	1	12		
France	C		1				
Greece	C	5	1	4	6	4	
Guatemala	C	22	24	43	18	26	7
Latvia	C	1					
Mexico (see also table above):							
Coahuila State	C		1				
Durango State	C	1					
Guanajuato State	C	9	7				
Leon	C	5	6				
Hidalgo State	C	6					
Jalisco State	C		8				
Guadalajara	C	1	1				
Mexico State	C	2	15				
Mexico, D. F.	C	178	159				
Mexico City	C	170	155				
Nayarit State	D		6				
Oaxaca State	C	5	6				
Mexico (see also table above)—Con.							
Puebla State	C	7					
Puebla	C	5	9				
Queretaro State	C		5				
San Luis Potosi State	D	11	3				
San Luis Potosi	C	1	1				
Sonora State	C		4				
Vera Cruz State	C		7				
Vera Cruz	C		2				
Morocco	C	65	12	3	8		13
Panama Canal Zone	C	1			5		
Peru	C	16	3	41	16		
Portugal	C	4		3	2		
Rumania	C	59	36	26	37	93	
Turkey	C	42	34	10	13	18	35
Union of South Africa:							
Cape Province	C	79	97	55	66	79	
Natal	C	2	4			6	
Orange Free State	C	37	37	19	23	18	
Transvaal	C	3	6	2	2	25	
Yugoslavia	C	49	31	11	6	10	

[3] For 2 weeks.

[4] Includes imported cases.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		June 30–July 27, 1935	July 28–Aug. 31, 1935	Sept. 1–28, 1935	Week ended— October 1935				November 1935					December 1935				Jan. 4, 1936
					5	12	19	26	2	9	16	23	30	7	14	21	28	
Bolivia: Santa Cruz Department—Chuchio [1]																		
Brazil: [2]																		
Bahia State	C																1	2
Matto Grosso State [2]	C	9															1	
Minas Geraes State [2]	C	6	9													3	6	4
	D															2	3	
Para State	C					1												
Sao Paulo State [2]	C		1													2	2	1
Colombia:																		
Intendencia of Meta	C		1	1														
Acacias	C		1							2								
Restrepo	C	1								2								
Dahomey: Porto Novo	C	1																
Gold Coast:																		
Bawku	C					3												
Cape Coast	C		1															
Tamale	C			1														
Ivory Coast:																		
Abidjan	C																	
Indenie Circle	C											1				1		
Sassandra	C									1							1	
Senegal:																		
Dakar	C																	
Kolda [4]																[3] 1		
M'Bake	C																	
Sudan (French): Koutiala	C							1				1				1		

[1] During the month of June 1935, 1 case of yellow fever was reported at Chuchio, Bolivia.
[2] Yellow fever has also been reported in Brazil as follows: Matto Grosso State, week ended Jan. 18, 1936, 1 case, 1 death; week ended Feb. 1, 1936, 1 case, 1 death; Minas Geraes State, week ended Jan. 11, 1936, 1 case, 1 death; week ended Jan. 18, 1936, 4 cases, 4 deaths; week ended Feb. 1, 1936, 1 case, 1 death; Sao Paulo State, week ended Jan. 18, 1936, [illegible] cases, 3 deaths.
[3] Suspected.
[4] During the week ended Feb. 1, 1936, 1 case of yellow fever was reported at Kolda, Senegal.

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UNITED STATES PUBLIC HEALTH SERVICE

W. F. DRAPER, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen R C. WILLIAMS, *Chief of Division*

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PREVENTION OF INTRAVENOUSLY INOCULATED POLIOMYELITIS OF MONKEYS BY INTRANASAL INSTILLATION OF PICRIC ACID[1]

By Charles Armstrong, *Surgeon, United States Public Health Service*

Experimental and epidemiological considerations indicate that the usual natural route of infection in poliomyelitis is from the nose by way of the olfactory tract. Lennette and Hudson (*1*) by an ingenious experiment, have recently (1935) further emphasized the importance of this route of infection. These investigators sectioned the olfactory tract of five monkeys and then intravenously inoculated them, together with five intact controls, with 10 cc of a 10-percent poliomyelitis virus, on each of 3 successive days. Four of the five controls succumbed to poliomyelitis, while the five animals whose olfactory tracts were sectioned all remained well.

Lennette and Hudson feel that infection by the intravenous route is dependent upon the virus escaping from the blood stream to the nasal membranes, from which infection of the nervous system proceeds by way of the olfactory tract. In further support of this contention, these authors (*1*) recovered poliomyelitis virus from the pooled nasal washings collected from three monkeys 4 days following the first intravenous inoculation.

Armstrong and Harrison (*2*) recently showed that intranasally instilled picric acid tends to prevent subsequent poliomyelitis infection of monkeys with virus introduced by the same route. It was deemed of interest, therefore, to determine whether intranasally instilled picric acid would similarly tend to prevent intravenously inoculated poliomyelitis.

EXPERIMENTAL PROCEDURE

Nine monkeys were each given eight intranasal instillations of 1.5 cc of 0.32 percent picric acid in saline into each nostril; these nine prepared and nine nontreated control monkeys were then inoculated with two or three intravenous doses of poliomyelitis virus.[2] (Table 1, experiments 1 and 2.)

[1] From the National Institute of Health, Washington, D. C.

[2] The intranasal picric acid administrations were made with a 2-cc syringe (no needle), the animal being held ventral side up, no anesthesia being employed. The virus inoculations were made into a vein of the leg.

TABLE 1.—*Summary of experiments*

Monkey no.	Date of preparation								Date of virus			Picric-acid prepared		Controls		Clinical and pathological diagnosis
	12/13/35	12/15/35	12/18/35	12/19/35	12/21/35	12/23/35	12/26/35	12/30/35	1/2/36	1/3/36		Days first virus to fever	Days first virus to complete paralysis	Days first virus to fever	Days first virus to complete paralysis	
Experiment 1																
77	P	P	P	P	P	P	P	P	V	V	----	----	S	----	------	
14	P	P	P	P	P	P	P	P	V	V	----	----	S	----	------	
992	P	P	P	P	P	P	P	P	V	V	----	----	S	----	------	
958	P	P	P	P	P	P	P	P	V	V	----	8	7	----	------	Poliomyelitis.
72	P	P	P	P	P	P	P	P	V	V	----	----	*13	----	------	Dysentery.
78	---	----	----	----	----	----	----	----	V	V	----	----	------	8	12	Poliomyelitis.
15	---	----	----	----	----	----	----	----	V	V	----	----	------	6	14	Do
20	---	----	----	----	----	----	----	----	V	V	----	----	------	11	S	Fever and tremors; no paralysis; poliomyelitis (?).
993	---	----	---	----	----	----	----	----	V	V	----	----	------	9	12	Poliomyelitis.
75	---	----	----	----	----	----	----	----	V	V	----	----	------	----	S	
	1/14/36	1/16/36	1/18/36	1/20/36	1/22/36	1/24/36	1/27/36	1/29/36	1/28/36	1/29/36	1/30/36					
Experiment 2																
129	P	P	P	P	P	P	P	P	V	V	V	----	S	----	------	
130	P	P	P	P	P	P	P	P	V	V	V	----	S	----	------	
131	P	P	P	P	P	P	P	P	V	V	V	5	7	---	------	Poliomyelitis.
132	P	P	P	P	P	P	P	P	V	V	V	---	S	----	------	
133	---	----	----	----	----	----	----	----	V	V	V	----	------	----	S	
134	- --	----	----	----	----	----	----	----	V	V	V	----	------	9	11	Poliomyelitis.
135	---	----	----	----	----	----	----	----	V	V	V	---	-----	5	10	Do.
136	---	----	----	----	----	----	----	----	V	V	V	----	------	6	8	Do.

P = 0.32 percent picric acid
V = Poliomyelitis virus
S = Survived
* No paralysis.

The inoculum was prepared by grinding portions of several glycerinated cords and diluting with saline to make a 4- to 8-percent suspension. The mixture was then centrifuged and 5 to 10 cc of the supernatant fluid was intravenously injected on two or three successive days, controls and treated animals being identically handled.

RESULTS

Many of the monkeys reacted to the virus injections, immediately developing what appeared to be a severe anaphylactic shock from which they recovered after a few minutes.

Among the nine picric-acid-prepared animals there were two deaths from poliomyelitis, both on the seventh day, and one from dysentery on the thirteenth day; the latter showed no clinical or pathological

evidence of poliomyelitis. There were, on the other hand, six deaths from poliomyelitis among the nine control monkeys, while another developed high fever on the eleventh day, with suggestive symptoms. The animal developed no paralysis, however, and the cause of the illness is questionable. It thus appears that picric acid instilled into the nostrils tended to prevent intravenously inoculated poliomyelitis.

DISCUSSION

Armstrong and Harrison (*2*) demonstrated that intranasally instilled picric acid protected 90 percent of monkeys against intranasal inoculation which produced poliomyelitis in approximately 90 percent of the controls.

As noted above, there were seven of nine monkeys which received intranasally instilled picric acid and failed to develop poliomyelitis following the intravenous virus inoculations, as compared with three, and possibly only two, of nine nonprepared controls. It appears, therefore, that intranasally applied picric acid is somewhat more effective against the intranasally inoculated than it is against the intravenously inoculated disease. This moderate difference is possibly to be explained by the assumption that certain portions of the nasal membranes inaccessible to intranasally instilled picric acid are likewise inaccessible to virus by the same route, but accessible to virus from the blood stream. It is conceivable, however, that infection from the blood stream into the central nervous system may occasionally take place, either at levels of the membranes too deep to be influenced by picric acid applied to their surface, or even by a more direct escape of virus from the bood vessels, especially following severe shock such as several of the prepared and control animals suffered at the time of inoculation.

SUMMARY

1. Picric acid instilled into the nostrils tends to protect monkeys from intravenous inoculations with poliomyelitis virus.

2. These results tend to confirm the conclusions of Lennette and Hudson, based on actual section of the olfactory tract, that intravenously inoculated poliomyelitis virus produces infection of the central nervous system by way of the nasal membranes and the olfactory tract.

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THE TRANSPLANTATION OF SPLENIC TISSUE IN MICE

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As a consideration of the early work on the transplantation of normal tissue is beyond the scope of this paper, reference is made to an article by Loeb (1930) which presents a complete review of the literature.

The importance of using inbred strains of experimental animals in transplantation studies has been realized within the past few years. From a genetic point of view very few experiments may be included in a survey of the literature which included only observations made on homozygous individuals.

The work of Little and Johnson (1922) on the transplantation of splenic tissue in mice showed that the "pedigree" relationship was of less importance than the "genetic" relationship. The conclusion advanced, since the F_2 generation animals were not inoculated, was that in all probability splenic tissue susceptibility was dependent upon multiple factors.

Loeb and King (1927), after transplanting various tissues in rats, "concluded that long continued inbreeding through successive brother and sister matings does not result in a greater homogeneity of the individuality differentials of the various members of the same inbred strain." Spleen was found to be a very sensitive tissue to transplant. Loeb's previous observations were confirmed that the character of the individuality differentials of the host and donor determined the absolute severity of the reaction.

From their work on inbred lines of guinea pigs, Loeb and Wright (1927) stated: "From these results we may conclude that it is not the similarity or difference between individuality differentials of donor and host which determines the reaction against the transplant, but the reaction depends on the presence in the host of genetic factors of the donor. The lack in the donor of genetic factors present in the host is apparently of little or no consequence. * * *". This conclusion was essentially the same as the theory advanced by Little and Johnson for splenic tissue.

Of considerable importance in the transplantation of normal tissue is the length of time the tissues are permitted to remain in the hosts between inoculation and observation. This is clearly demonstrated in the work of Loeb and Wright in which the tissues were graded histologically to express the reaction of the hosts against the transplants. Tissues which were autotransplanted had grade 6. Transplantation from brother to brother within an inbred family gave an average grade of 5.9. In this series the examinations were made

from 10 days to 5 months and 16 days after inoculation. The average grade was 3.2 for tissues from F_1 generation hybrids which were transplanted into pure-strain animals. The time period varied from 20 to 37 days. In one series of 15 animals examined between 20 and 25 days after inoculation the average grade was 3.3, and the average was grade 2.7 for six animals observed between 35 and 37 days. Thus, such a classification would also indicate the time the tissues remained in the hosts following inoculation.

In this report we wish to present the results observed for the transplantation of splenic tissue into inbred mice and their hybrids. All the grafts remained in the hosts for at least 100 days before examination, as preliminary studies showed that some tissues which had been inoculated into expected resistant hosts were in various stages of degeneration for approximately 50 days after inoculation. Thus, we have assumed that individuals which had retained grafts for this period of 100 days may be grouped as susceptible.

STOCKS OF MICE

Two inbred strains of mice were employed as hosts, the *Z* or C_3H, and the *N* stocks. Reciprocal F_1, F_2, and back-cross generation hybrids were inoculated. They are grouped in the tabulations, however, as no significant variation was observed in the results. The back-cross generations were termed the *ZBC* or *NBC*, designating to which parental strain the F_1 mice were mated.

The trochar method of transplantation was used.

RESULTS

The observations obtained from the transplantation of splenic tissue from the *Z* and *N* stock mice and the ZNF_1 (Z♀×*N*♂) and NZF_1 (*N*♀×*Z*♂) generation hybrids are tabulated in table 1. The number of inoculations into representatives of each stock or hybrid generation is given with the percentage of negative observations.

TABLE 1.—*Summary of results from the inoculation of splenic tissue in mice*

Stock inoculated	Splenic tissue from *Z* stock		Splenic tissue from *N* stock		Splenic tissue from ZNF_1 mice		Splenic tissue from NZF_1 mice	
	Number inoculated	Percent negative	Number inoculated	Percent negative	Number inoculated	Percent negative	Number inoculated	Percent negative
Z	51	17.7	51	100 0	0	--------	32	100.0
N	39	100.0	57	7.5	52	100 0	34	100.0
F_1	83	16.9	83	7.2	54	10.2	54	0.0
F_2	156	94 9	193	88.1	255	98 0	104	97.1
ZBC	57	7 0	57	96 5	34	97.1	20	95.0
NBC	61	100 0	76	7.0	36	94.4	21	100.0
Total	447	--------	517	--------	431	--------	265	--------

The negative percent of 94.9 in the F_2 generation after inoculation of splenic tissue from Z stock donors would indicate that 10 or 11 factors (expected, 94.4 or 95.8 percent, respectively) are necessary for growth.

Grafts from the N line mice did not persist in 88.1 percent of the F_2 hybrid animals. The expectation for 7 factors was 86.7 percent and for 8 factors 90.0 percent.

Splenic tissue from the reciprocal F_1 hybrid mice gave negative observations after grafting into hosts representing the parental stocks. The combined observations for F_1 hosts were 103+:5−; for the F_2 generation, 8+:351−, or 97.8 percent negative; for the *ZBC* generation, 2+:52−, or 96.3 percent; and the *NBC* generation, 2+:55−, or 96.5 percent. The negative percentage in the F_2 hybrids showed that approximately 13 factors (97.6 percent) are required for susceptibility. The small number of animals observed in the back-cross generations was not sufficient to determine accurately the number of the susceptibility factors contributed by each inbred strain. A comparison of observation with expectation indicated about 8 factors (96.9 percent), some of which were evidently common to both stocks.

In the expected susceptible classes, 494 inoculations were made. Of this number, 446 grafts, or 90.3 percent were retained. The experimental error was thus about 10 percent in this group, due possibly to faulty technique, the failure of the grafts to establish a blood supply, infection, or the inability to locate the tissue.

SUMMARY

The numbers of susceptibility factors required for the retention of grafts of splenic tissue in hosts were as follows: Z stock, 10 or 11 factors; N stock, 7 or 8 factors; and tissues from reciprocal F_1 generation hybrids, approximately 13 factors. A small number of observations in the back-cross mice showed that about 8 factors were contributed by each parental strain to the F_1 genetic make-up, a few of which were probably common factors.

DISCUSSION

That the response of the host is similar to grafts of normal tissue as well as neoplastic tissue is evident from the work of Little and Johnson and Loeb and Wright on the former and Tyzzer, Little, Strong, and others on tumor implants. The great difference is in the method of determining the reaction of the host to the graft. Following tumor inoculation one may say quite definitely that, if a graft grows progressively and kills the host, the host is without doubt susceptible to that particular tissue. Individuals in expected susceptible classes which are resistant may be reinoculated with often positive results.

Following the inoculation of normal tissues there is, with few exceptions, no growth to indicate the reaction of the host. The time element and the factor of infection eliminate examination by operation, especially when multiple grafts have been inoculated. The most satisfactory method of observation would appear to be autopsy of the hosts after a period sufficient for the complete regression of grafts in resistant animals.

The transplantation of splenic tissue between strains of inbred mice and their first generation hybrids confirm the previously reported work of Little and Johnson (1922) and of Loeb and Wright (1927) on guinea pigs. By the use of F_2 and back-cross generation individuals it has been demonstrated that susceptibility to grafts of splenic tissue is dependent upon the simultaneous presence in the genetic constitution of the host of all the multiple growth factors of the transplant. The lack of one or more of the susceptibility factors would cause the regression of the grafts by the host.

Thus, it is possible to formulate a genetic theory for the transplantation of splenic and probably all normal tissue, similar to the theory for tumor tissue as contributed by Little and Tyzzer (1916) and confirmed by Little and Strong (1924).

CONCLUSION

Susceptibility or retention of implants of splenic tissue, and probably of all normal tissue, is dependent upon the simultaneous presence in the genetic make-up of the host of all the growth factors found in the genetic constitution of the graft.

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BIOLOGICAL PRODUCTS

ESTABLISHMENTS LICENSED FOR THE PROPAGATION AND SALE OF VIRUSES, SERUMS, TOXINS, AND ANALOGOUS PRODUCTS

There is presented herewith a list of the establishments holding licenses issued by the Treasury Department in accordance with the act of Congress approved July 1, 1902, entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes."

The licenses granted to these establishments for the products mentioned do not imply an endorsement of the claims made by the manufacturers for their respective preparations. The granting of a license means that inspection of the establishment concerned and laboratory examinations of samples of its products are made regularly to insure the observance of safe methods of manufacture, to ascertain freedom from contamination, and to determine the potency or safety, or both, of botulinus antitoxin, diphtheria antitoxin, perfringens antitoxin, scarlet fever streptococcus antitoxin, staphylococcus antitoxin, tetanus antitoxin, vibrion septique antitoxin, antidysenteric serum, antimeningococcic serum, antipneumococcic serum, bacterial vaccines made from typhoid bacillus, paratyphoid bacillus A, and paratyphoid bacillus B, diphtheria toxin-antitoxin mixture, diphtheria toxoid, diphtheria toxin for Schick test, scarlet fever streptococcus toxin for Dick test, scarlet fever streptococcus toxin for immunization, and the arsphenamines, the only products for which potency standards or tests have been established.

The enumeration of the products is as follows: Serums are placed first, the antitoxins, being more important, heading the list. The other products are arranged generally in the order of their origin. The items in each class are arranged alphabetically.

Establishments Licensed and Products for Which Licenses Have Been Issued

AMERICAN ESTABLISHMENTS

Parke, Davis & Co., Detroit, Mich.—License no. 1:

Diphtheria antitoxin; meningococcus antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; anti-influenza bacillus serum, antimeningococcic serum; antipneumococcic serum, antistreptococcic serum, hemostatic serum (Lapenta); normal horse serum; thyroidectomized horse serum, smallpox vaccine; rabies vaccine (Cumming); tuberculin old; tuberculin T. R.; tuberculin B. E ; tuberculin B. F.; bacterial vaccines made from acne bacillus, acne diplococcus, Brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, prodigiosus bacillus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus, diphtheria toxin-antitoxin mixture; diphtheria toxoid-antitoxin mixture; diphtheria toxoid, diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; animal epidermal extracts; animal food extracts; vegetable food extracts; poison ivy extract; pollen extracts; modified bacterial derivatives made from colon bacillus, gonococcus, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from colon bacillus, gonococcus, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aurens, and streptococcus.

Mulford Biological Laboratories, Sharp & Dohme, Broad and Wallace Streets, Philadelphia, Pa.—License no. 2:

Botulinus antitoxin; diphtheria antitoxin; erysipelas streptococcus antitoxin; B. histolyticus antitoxin; B. odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; B. sordelli antitoxin; staphylococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antierysipeloid serum; antigonococcic serum; anti-influenza bacillus serum; antimelitensis serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum, antitularemic serum, antivenin (Nearctic crotalidae); antivenin Bothropic; antivenin (crotalus terrificus); antivenim (Latrodectus mactans): normal horse serum; smallpox vaccine; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus

catarrhalis, micrococcus melitensis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, bacterium tularense, and typhoid bacillus; sensitized bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillu_ meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; staphylococcus toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts; poison ivy extract; poison oak extract; pneumococcus antibody solution; bacterial antigens made from acne bacillus, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, proteus bacillus, pyocyaneus bacillus, staphylococcus aureus, streptococcus, typhoid bacillus; bee venom; snake venom solution.

The Cutter Laboratory, Berkeley, Calif.—License no. 8:

Diphtheria antitoxin; B. odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; B. sordelli antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antistreptococcic serum; normal horse serum; smallpox vaccine; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin B. F.; bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from colon bacillus, staphylococcus aureus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; pollen extracts; poison ivy extract; poison oak extract.

Bureau of Laboratories, Department of Health, Foot East Sixteenth Street, New York City.—License no. 14:

Smallpox vaccine.

Lederle Laboratories, Inc., Pearl River, N. Y.—License no. 17:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; B. histolyticus antitoxin; B. odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; staphylococcus antitoxin; B. sordelli antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; measles immune serum; immune globulin (human); normal horse serum; smallpox vaccine; rabies vaccine (killed virus); tuberculin old; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, Brucella melitensis, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid, tetanus toxoid; staphylococcus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; poison ivy extract; poison oak extract; animal epidermal extracts; animal food extracts; vegetable food extracts; animal oil extracts; vegetable oil extracts; fungus extracts; snake venom solution.

G. H. Sherman, M. D., Inc., 14600 East Jefferson Avenue, Detroit, Mich.—License no. 30:

Bacterial vaccines made from acne bacillus, Brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; pollen extracts; bacterial antigens made from colon bacillus, gonococcus, micrococcus catarrhalis, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, and streptococcus.

The Abbott Laboratories, Fourteenth Street and C.-W. Interurban Railroad Tracks, North Chicago, Ill.—License no. 43:

Bacterial vaccines made from acne bacillus, Brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, micrococcus tetragenus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, micrococcus catarrhalis, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts.

The Upjohn Co., Kalamazoo, Mich.—License no. 51:

Bacterial vaccines made from colon bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from colon bacillus, staphylococcus a

E. R. Squibb & Sons' Research and Biological Laboratories, New Brunswick, N. J.—License no. 52:
Diphtheria antitoxin, erysipelas streptococcus antitoxin, perfringens antitoxin, scarlet fever streptococcus antitoxin, staphylococcus antitoxin; tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; immune globulin (human); normal horse serum; smallpox vaccine; rabies vaccine (Pasteur); rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus; bacterial antigen made from staphylococcus aureus; leucocytic extract from the horse; diphtheria toxin-antitoxin mixture; diphtheria toxoid; staphylococcus toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; poison ivy extract; poison oak extract; arsphenamine, neoarsphenamine, sulpharsphenamine.

Eli Lilly & Co., Indianapolis, Ind.—License no. 56:
Diphtheria antitoxin; erysipelas streptococcus antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; hemostatic serum (Lilly); heterophile antibody; smallpox vaccine; rabies vaccine (Harris); tuberculin old; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial vaccines made from partially autolized pneumococci; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test; bacterial antigens made from acne bacillus, colon bacillus, gonococcus, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Gilliand Laboratories, Marietta, Pa.—License no. 63:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; smallpox vaccine; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin B E ; tuberculin, B. F.; bacterial vaccines made from acne bacillus, gonococcus, influenza bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus, diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

Antitoxin and Vaccine Laboratory, Department of Public Health, Commonwealth of Massachusetts, 375 South Street, Jamaica Plain, Boston 30, Mass.—License no. 64:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; antimeningococcic serum; antipneumococcic serum; smallpox vaccine; tuberculin old; bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid, diphtheria toxin for Schick test.

United States Standard Products Co , Woodworth, Wis —License no 65:
Diphtheria antitoxin; erysipelas streptococcus antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; normal horse serum; smallpox vaccine; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from staphylococcus albus, staphylococcus aureus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; poison ivy extract.

D. L. Harris Laboratories, Metropolitan Building, St. Louis, Mo.—License no. 66:
Rabies vaccine (Harris).

The Arlington Chemical Co , Yonkers, N. Y.—License no 67:
Bacterial vaccines made from colon bacillus, micrococcus catarrhalis, micrococcus tetragenus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, and streptococcus; fungus extracts; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts.

Dermatological Research Laboratories, 1720 Lombard Street, Philadelphia, Pa.—License no. 68:
Arsphenamine; silver arsphenamine; neoarsphenamine; sulpharsphenamine; bismuth arsphenamine sulphonate; neosilver arsphenamine

The Winthrop Chemical Co., Inc., 33 Riverside Avenue, Rensselaer, N. Y.—License no. 69:
Arsphenamine; arsphenamine diglucoside; neoarsphenamine; sodium arsphenamine; silver arsphenamine; neosilver arsphenamine; sulpharsphenamine.

Diarsenol Co (Inc), 771 Ellicott Square, Buffalo, N. Y — License no. 70:
Arsphenamine; neoarsphenamine; sodium arsphenamine; sulpharsphenamine.

Mallinckrodt Chemical Works, St Louis, Mo.—License no. 77:
Arsphenamine; neoarsphenamine, sulpharsphenamine.

Merck & Co. (Inc.), Rahway, N. J.—License no. 82:
Arsphenamine; neoarsphenamine; sulpharsphenamine; a compound of glucose with arsphenamine base.

Terrell Laboratories, Texas National Bank Building, Fort Worth, Tex.—License no. 84:
Rabies vaccine (killed virus).

Jensen-Salsbery Laboratories, Twenty-first and Penn Streets, Kansas City, Mo.—License no. 85:
Botulinus antitoxin; antianthrax serum; rabies vaccine (killed virus); bacterial vaccine made from Brucella melitensis; diphtheria toxin for Schick test; diphtheria toxoid.

Hollister-Stier Laboratories, Paulson Medical and Dental Building, Spokane, Wash.—License no. 91:
Acute anterior poliomyelitis serum (human); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and xerosis bacillus; pollen extracts; poison ivy extract; poison oak extract.

Medical Arts Laboratory, Medical Arts Building, Oklahoma City, Okla.—License no. 98:
Rabies vaccine (killed virus).

Bureau of Laboratories, Michigan State Department of Health, Lansing, Mich.—License no. 99:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; antimeningococcic serum, smallpox vaccine; rabies vaccine (Cumming); tuberculin old; bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

National Drug Co., 5109 Germantown Avenue, Philadelphia, Pa.—License no. 101:
Diphtheria antitoxin, perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; tuberculin old; smallpox vaccine; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, Brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts.

Mulford Colloid Laboratories, Thirty-eighth and Ludlow Streets, Philadelphia, Pa.—License no. 102:
Poison ivy extract; poison oak extract.

Allergy Laboratories, 1200 North Walker Street, Oklahoma City, Okla.—License no. 103:
Pollen extracts; vegetable food extracts; animal epidermal extracts.

Hixson Laboratories (Inc.), Johnstown, Ohio.—License no. 104:
Diphtheria antitoxin; tetanus antitoxin; antimeningococcic serum; normal horse serum; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test.

C. F. Kirk Co., Bloomfield, N. J.—License no. 105:
Bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus

Knapp & Knapp, Independence, Mo.—License no. 106:
Pollen extracts.

The Porro Biological Laboratories, 718 Medical Arts Building, Tacoma, Wash.—License no. 107:
Bacterial vaccines made from micrococcus catarrhalis, pneumococcus, staphylococcus aureus, and streptococcus; pollen extracts.

Phagoid Laboratories (Inc.), Breslin Medical Arts Building, Louisville, Ky.—License no. 109.
Bacterial antigens made from colon bacillus, Friedländer bacillus, gonococcus, micrococcus catarrhalis, pertussis bacillus, pneumococcus, pyocyaneus bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus.

Pitman-Moore Co., Zionsville, Ind —License no. 110:
Tetanus antitoxin; antierysipeloid serum; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Brucella melitensis, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, micrococcus tetragenus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from colon bacillus, gonococcus, staphylococcus albus, staphylococcus aureus, streptococcus; diphtheria toxoid; pollen extracts.

The Wm. S. Merrell Co., Cincinnati, Ohio.—License no. 111:
Bacterial vaccines made from Brucella melitensis, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus,

staphylococcus aureus, staphylococcus citreus, streptococcus, typhoid bacillus; bacterial antigens made from colon bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, typhoid bacillus; diphtheria toxoid, diphtheria toxin for Schick test.

The Wyatt Clinic Research Laboratories, Tucson, Ariz.—License no. 112:

Bacterial antigen made from streptococcus.

Michael Reese Hospital, Twenty-ninth Street and Ellis Avenue, Chicago, Ill.—License no. 113:

Acute anterior poliomyelitis immune serum (human); measles immune serum (human); scarlet fever immune serum (human); normal human serum.

The Milwaukee Serum Center, Columbia Hospital, Milwaukee, Wis.—License no. 117:

Acute anterior poliomyelitis immune serum (human); measles immune serum (human); scarlet fever immune serum (human); normal human serum.

Lee Laboratories, 1457 Neil Avenue, Columbus, Ohio.—License no. 118:

Rabies vaccine (killed virus); diphtheria toxoid.

Barry Allergy Laboratory, Michigan Theater Building, Detroit, Mich.—License no. 119:

Pollen extracts.

Biological Laboratory, Illinois Department of Health, Springfield, Ill.—License no. 120:

Rabies vaccine (killed virus); bacterial vaccine made from typhoid bacillus; diphtheria toxoid.

State Department of Health, Austin, Tex.—License no. 121:

Rabies vaccine (killed virus); bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, typhoid bacillus; diphtheria toxin for Schick test; diphtheria toxoid.

FOREIGN ESTABLISHMENTS

Institut Pasteur de Paris, Paris, France.—License no. 11. Selling agents for the United States, Mr. A. Charklian, Pasteur Vaccine Laboratories of France, 516 Fifth Avenue, New York, N. Y.:

Diphtheria antitoxin; tetanus antitoxin; antianthrax serum; antidysenteric serum; antiplague serum; antistreptococcic serum; bacterial vaccines made from cholera vibrio, plague bacillus, staphylococcus albus, and staphylococcus aureus.

Interessen Gesellschaft Farbenindustrie Aktiengesellschaft, Hoechst am Main, Germany.—License no. 24. Selling agents for the United States, The Winthrop Chemical Co., 170 Varick Street, New York City:

Tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from cholera vibrio, gonococcus, staphylococcus albus, staphylococcus aureus, and staphylococcus citreus; typhoid bacillus; sensitized bacterial vaccine made from typhoid bacillus; fungus extracts; arsphenamine; neoarsphenamine; sodium arsphenamine; silver arsphenamine; neosilver arsphenamine; sulpharsphenamine; sulphoxylarsphenamine.

Connaught Antitoxin Laboratory, University of Toronto, Toronto, Canada.—License no. 73:

Diphtheria antitoxin; staphylococcus antitoxin; tetanus antitoxin; diphtheria toxoid; staphylococcus toxoid.

Laboratoire de Biochimie Médicale, 19–21 rue Van-Loo, Paris, France.—License no. 83. Selling agents for the United States, Anglo-French Drug Co., 1270 Broadway, New York City; selling agents for Puerto Rico, Chas. Vere, box 216, San Juan, P. R.:

Sulpharsphenamine.

Instituto Sieroterapico Milanese, Via Darwin 20, Milan, Italy.—License no. 87. Selling agents for the United States, Italian Drugs Importing Co., 225 Lafayette Street, New York City, N. Y.; selling agent for Puerto Rico, Mr. Braulio Caballero, San Juan, P. R.

Antianthrax serum; bacterial vaccines made from colon bacillus, gonococcus, pneumococcus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, and streptococcus; neoarsphenamine.

Boots Pure Drug Co., Ltd., Nottingham, England.—License no. 92. Selling agents for the United States. The United Drug Co., 43 Leon Street, Boston, Mass :

Arsphenamine diglucoside.

Sero-Bacteriological Department, Bayer-Meister-Lucius, Behringswerke, I. G. Farbenindustrie, A. G. Section, Marburg-Lahn, Germany.—License no. 97. Selling agents for the United States, The Winthrop Chemical Co., 170 Varick Street, New York City.

Diphtheria antitoxin; tetanus antitoxin; antistreptococcic serum, normal horse serum; bacterial vaccines made from colon bacillus, gonococcus, pneumococcus, pyocyaneus bacillus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Laboratoire de Bacteriophage, 75 rue Olivier de Serres, Paris, France.—License no. 108. Selling agents for the United States, Anglo-French Drug Co., 1270 Broadway, New York City; selling agents for Puerto Rico, Mr. Joaquin Belendez, San Juan, P. R.

Bacterial antigens made from colon bacillus, dysentery bacillus, enterococcus, Friedländer bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, proteus bacillus, pyocyaneous bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus.

Dr. Kade, Elisabeth Ufer 35, Berlin SO, 36, Germany.—License no. 114:

Bacterial vaccine made from colon bacillus.

La Biotherapie, 3 rue Maublanc, Paris, France.—License no. 115:
Bacterial vaccines made from cholera vibrio, dysentery bacillus, paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; bacterial antigens made from pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Laboratorio Brasileiro de Chimiotherapia, Rua General Roca No. 28, Rio de Janeiro, Brazil.—License no. 116. Selling agents for the United States and Hawaii, Ernst Bischoff Co., Inc., 135 Hudson Street, New York, N. Y.; selling agents for Puerto Rico, Cesar A. Toro, Apartado 3854, Santurce, P. R.
Fungus extracts.

DEATHS DURING WEEK ENDED FEBRUARY 15, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb. 15, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,930	9,018
Deaths per 1,000 population, annual basis	13.9	12.6
Deaths under 1 year of age	579	562
Deaths under 1 year of age per 1,000 estimated live births	52	52
Deaths per 1,000 population, annual basis, first 7 weeks of year	13.4	13.1
Data from industrial insurance companies:		
Policies in force	67,901,211	67,265,885
Number of death claims	11,894	12,696
Death claims per 1,000 policies in force, annual rate	9.2	9.8
Death claims per 1,000 policies, first 7 weeks of year, annual rate	10.4	10.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Feb. 22, 1936, and Feb. 23, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 22, 1936, and Feb. 23, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935
New England States:								
Maine	4		1	3	272	386	1	0
New Hampshire					24	17	0	0
Vermont					370	4	0	0
Massachusetts	11	8			357	400	3	1
Rhode Island		2			32	55	2	1
Connecticut		3	4	12	78	689	4	1
Middle Atlantic States:								
New York	37	41	[1] 92	[1] 27	1,810	1,905	20	5
New Jersey	12	18	11	21	100	574	3	0
Pennsylvania	34	51			616	3,006	4	7
East North Central States:								
Ohio	29	74	70	53	108	760	8	17
Indiana	20	36	34	71	11	584	2	4
Illinois	31	54	64	46	29	2,341	13	13
Michigan	13	7	4	31	50	1,219	2	0
Wisconsin	1	4	58	134	137	1,598	3	3
West North Central States:								
Minnesota	1	4	1		168	2,272	0	1
Iowa	11	2	5	34	8	1,575	3	5
Missouri	23	46	402	393	25	607	3	4
North Dakota		10	10	75		61	1	0
South Dakota	2	0		4	1	36	0	0
Nebraska	6	9			40	538	3	9
Kansas	16	12	22	25	16	1,507	2	4
South Atlantic States:								
Delaware				7	78		0	0
Maryland [2]	5	10	34	69	136	46	14	7
District of Columbia	21	8	3	7	8	11	4	11
Virginia	14	17			70	1,253	33	6
West Virginia	9	13	131	211	11	678	5	0
North Carolina	23	17	311	216	89	765	5	5
South Carolina	2	6	1,272	580	17	27	10	0
Georgia [2]	9	9	1,058	356			4	0
Florida [2]	2	8	51	43	1	40	2	3
East South Central States:								
Kentucky	9	24	104	419	154	905	9	14
Tennessee	12	14	246	366	202	38	8	7
Alabama [2]	14	21	1,189	1,839	11	568	2	3
Mississippi [2]	1	7					1	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 22, 1936, and Feb. 23, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935
West South Central States:								
Arkansas	6	23	233	103	--------	60	2	2
Louisiana	14	32	24	46	70	105	5	2
Oklahoma [4]	5	17	227	278	1	50	9	1
Texas [3]	56	44	751	661	174	267	17	7
Mountain States:								
Montana	--------	3	57	455	30	237	1	0
Idaho	2	1	2	7	44	53	0	0
Wyoming	--------	--------	--------	--------	4	132	4	0
Colorado	5	8	--------	--------	14	593	1	4
New Mexico	3	8	6	45	9	23	0	2
Arizona	2	2	215	67	46	23	0	1
Utah [3]	--------	--------	--------	--------	10	15	0	0
Pacific States:								
Washington	3	4	--------	18	236	130	2	1
Oregon	1	--------	148	143	642	87	1	0
California	37	51	5,030	158	1,817	601	7	5
Total	506	728	11,870	7,018	8,126	26,841	223	160
First 8 weeks of year	5,370	6,259	38,450	69,801	47,669	146,324	1,468	833

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935
New England States:								
Maine	0	0	24	22	0	0	1	3
New Hampshire	0	0	16	5	0	0	0	0
Vermont	0	0	16	16	0	0	0	0
Massachusetts	1	0	241	190	0	0	1	0
Rhode Island	0	0	17	17	0	0	0	0
Connecticut	0	0	78	53	0	0	0	2
Middle Atlantic States:								
New York	0	1	858	793	0	0	5	5
New Jersey	1	1	296	149	0	0	3	1
Pennsylvania	1	0	511	508	0	0	3	13
East North Central States:								
Ohio	0	1	280	940	1	0	2	4
Indiana	0	0	358	223	1	0	1	1
Illinois	1	0	706	944	6	1	4	3
Michigan	0	0	813	371	0	0	3	3
Wisconsin	0	0	573	600	12	22	1	0
West North Central States:								
Minnesota	0	0	273	150	16	9	1	0
Iowa	0	1	178	101	5	2	5	2
Missouri	0	0	215	113	5	1	1	0
North Dakota	0	0	64	46	10	5	0	0
South Dakota	0	0	68	17	23	12	0	0
Nebraska	0	0	150	38	42	21	0	0
Kansas	0	0	325	108	7	6	0	0
South Atlantic States:								
Delaware	0	0	6	12	0	1	0	0
Maryland [3]	1	0	78	107	0	0	2	5
District of Columbia	0	1	20	44	0	0	0	2
Virginia	0	0	38	49	0	0	2	3
West Virginia	0	0	38	153	0	0	1	4
North Carolina	0	0	24	29	1	0	1	2
South Carolina	0	0	4	3	0	0	1	0
Georgia [3]	0	0	25	6	1	0	2	2
Florida [3]	0	0	4	2	0	0	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 22, 1936, and Feb. 23, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935	Week ended Feb. 22, 1936	Week ended Feb. 23, 1935
East South Central States:								
Kentucky	1	0	63	87	0	0	6	8
Tennessee	0	0	27	42	0	0	2	2
Alabama [3]	0	1	27	18	1	2	0	7
Mississippi [2]	0	0	16	15	0	1	1	1
West South Central States:								
Arkansas	0	0	17	8	0	1	4	2
Louisiana	0	0	15	14	3	1	3	7
Oklahoma [4]	1	0	31	21	0	4	3	7
Texas [3]	0	2	133	86	2	0	4	11
Mountain States:								
Montana	0	0	124	24	11	0	1	1
Idaho	0	0	88	15	5	0	0	0
Wyoming	0	0	83	5	10	7	0	0
Colorado	0	0	130	317	5	2	1	0
New Mexico	0	0	43	21	0	8	0	2
Arizona	0	0	28	19	0	0	0	0
Utah [2]	0	0	111	96	0	0	0	0
Pacific States:								
Washington	0	0	91	-------	27	23	0	1
Oregon	0	0	59	62	1	4	4	0
California	1	10	368	242	1	9	9	4
Total	8	18	7,251	6,901	196	142	79	113
First 8 weeks of year	170	216	57,392	52,107	1,795	1,634	885	1,150

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Feb 22, 1936, 15 cases, as follows: Georgia, 4; Florida, 2; Alabama, 1; Texas, 8.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January 1936										
Alabama	10	80	1,180	61	79	13	4	56	-------	8
Georgia	16	68	1,130	95	20	9	1	109	5	10
Hawaii Territory	4	5	2,939	-------	1	-------	1	1	0	2
Idaho	1	5	20	-------	260	1	3	403	9	3
Illinois	49	206	173	8	208	-------	4	2,788	49	22
Iowa	19	55	21	-------	31	-------	2	817	57	9
Kansas	9	61	107	-------	110	-------	3	950	69	5
Louisiana	3	89	70	51	142	10	1	92	5	16
Maryland	42	42	135	-------	566	-------	1	376	0	15
Minnesota	12	21	2	-------	528	-------	1	1,678	71	15
Mississippi	11	30	7,928	1,192	879	122	0	51	6	5
Rhode Island	4	3	-------	-------	716	-------	0	121	0	3
South Dakota	2	17	4	-------	111	-------	0	370	107	1
Tennessee	44	100	534	9	41	-------	2	173	0	8
Texas	61	229	1,245	787	231	8	0	376	5	18
Wyoming	-------	5	-------	-------	6	-------	0	333	0	0

January 1936

	Cases
Actinomycosis:	
Minnesota	1
Chicken pox:	
Alabama	307
Georgia	132
Hawaii Territory	30
Idaho	79
Illinois	2,403
Iowa	392
Kansas	1,001
Louisiana	105
Maryland	423
Minnesota	1,009
Mississippi	762
Rhode Island	157
South Dakota	257
Tennessee	233
Texas	251
Wyoming	47
Conjunctivitis, infectious:	
Georgia	3
Dengue:	
Mississippi	1
Dysentery:	
Georgia (amoebic)	5
Georgia (bacillary)	3
Illinois (amoebic)	4
Illinois (bacillary)	3
Illinois (amoebic carriers)	30
Louisiana (amoebic)	1
Maryland (bacillary)	2
Minnesota (amoebic)	7
Mississippi (amoebic)	29
Mississippi (bacillary)	179
Tennessee	2
Texas	11
Epidemic encephalitis:	
Alabama	2
Illinois	2
Iowa	2
Kansas	4
Minnesota	1
Texas	1
German measles:	
Illinois	35
Iowa	8
Kansas	18
Maryland	100
Rhode Island	15
Tennessee	4
Hookworm disease:	
Georgia	889
Louisiana	2
Mississippi	212
Tennessee	1
Impetigo contagiosa:	
Iowa	5
Maryland	30
Tennessee	5
Lead poisoning:	
Illinois	4
Leprosy:	
Hawaii Territory	4
Louisiana	4
Mumps:	
Aalabama	386
Georgia	190
Hawaii Territory	4
Idaho	193
Illinois	1,244
Iowa	1,008
Kansas	297
Louisiana	32
Maryland	193
Mississippi	1,233
Rhode Island	337
South Dakota	171
Tennessee	98
Texas	1,071
Wyoming	60
Ophthalmia neonatorum:	
Alabama	1
Illinois	4
Tennessee	5
Paratyphoid fever:	
Illinois	1
Kansas	2
Maryland	1
Puerperal septicemia:	
Mississippi	16
Tennessee	1
Rabies in animals:	
Alabama	68
Illinois	4
Louisiana	31
Maryland	2
Mississippi	24
Texas	21
Rocky Mountain spotted fever:	
Alabama	3
Scabies:	
Kansas	3
Maryland	1
Tennessee	2
Septic sore throat:	
Georgia	34
Illinois	5
Iowa	7
Kansas	10
Louisiana	3
Maryland	20
Minnesota	7
Rhode Island	6
Tennessee	12
Wyoming	10
Tetanus:	
Alabama	2
Illinois	2
Tetanus—Continued.	
Rhode Island	1
Tennessee	3
Trachoma:	
Idaho	1
Illinois	11
Mississippi	4
Trichinosis:	
Maryland	6
Tennessee	3
Tularaemia:	
Alabama	2
Georgia	2
Illinois	10
Iowa	1
Louisiana	2
Maryland	6
Tennessee	5
Typhus fever:	
Alabama	8
Georgia	28
Maryland	1
Mississippi	1
Texas	13
Undulant fever:	
Alabama	3
Georgia	1
Hawaii Territory	1
Illinois	8
Iowa	7
Kansas	7
Louisiana	1
Maryland	2
Minnesota	5
Mississippi	3
Tennessee	1
Wyoming	1
Vincent's infection:	
Illinois	26
Kansas	13
Maryland	17
Tennessee	7
Whooping cough:	
Alabama	70
Georgia	28
Hawaii Territory	19
Idaho	10
Illinois	1,097
Iowa	101
Kansas	116
Louisiana	80
Maryland	174
Minnesota	94
Mississippi	425
Rhode Island	34
South Dakota	5
Tennessee	48
Texas	73
Wyoming	6

WEEKLY REPORTS FROM CITIES

City reports for week ended Feb. 15, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	5	1	0	0	0	1	25
New Hampshire:											
Concord	0	------	0	0	0	0	0	0	0	0	11
Manchester	0	------	0	2	2	3	0	0	0	0	20
Nashua	0	------	------	1	------	0	0	2	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	1	0	0	0	2	8
Rutland	0	------	0	8	1	19	0	0	0	0	9
Massachusetts:											
Boston	6	------	0	198	37	68	0	11	3	12	249
Fall River	1	------	0	0	5	4	0	2	0	1	42
Springfield	0	------	0	1	2	4	0	0	0	6	32
Worcester	1	------	0	2	11	10	0	3	0	10	57
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	15
Providence	1	7	0	19	12	12	0	4	0	3	65
Connecticut:											
Bridgeport	0	------	3	2	10	2	0	0	0	0	45
Hartford	------	------	------	------	------	------	------	------	------	------	------
New Haven	0	1	1	0	6	2	0	1	0	20	51
New York:											
Buffalo	0	------	1	19	16	55	0	7	0	16	151
New York	35	69	7	902	249	413	0	107	0	83	1,617
Rochester	0	------	0	2	2	3	0	5	0	1	85
Syracuse	0	------	0	55	10	7	0	3	0	30	58
New Jersey:											
Camden	2	------	2	1	4	6	0	1	0	4	36
Newark	0	7	0	2	12	119	0	15	0	14	[illegible]
Trenton	0	------	0	1	2	4	0	2	0	9	37
Pennsylvania:											
Philadelphia	8	------	7	360	50	61	0	24	0	62	582
Pittsburgh	2	8	3	17	35	73	0	4	0	21	200
Reading	0	------	0	0	0	8	0	1	0	0	24
Scranton	1	------	------	17	------	11	0	------	0	0	------
Ohio:											
Cincinnati	3	------	1	5	13	16	0	8	0	1	161
Cleveland	3	33	2	62	23	41	0	16	0	60	222
Columbus	1	8	8	1	7	13	0	1	0	4	118
Toledo	3	1	1	22	3	8	0	1	1	0	64
Indiana:											
Anderson	4	------	0	0	2	7	0	0	0	4	8
Fort Wayne	0	------	0	0	3	5	0	2	0	0	30
Indianapolis	2	------	0	2	21	64	0	8	0	8	108
Muncie	0	------	0	0	3	3	0	0	0	0	7
South Bend	0	------	0	1	2	3	0	0	0	2	17
Terre Haute	0	------	0	0	0	0	0	0	0	0	30
Illinois:											
Alton	1	------	0	0	1	1	0	0	0	0	9
Chicago	22	13	4	9	65	208	3	29	0	171	741
Elgin	0	------	0	0	3	2	0	0	0	0	15
Moline	0	------	0	0	3	9	0	0	0	2	6
Springfield	1	------	0	0	2	8	0	0	0	0	20
Michigan:											
Detroit	6	4	4	6	28	89	0	19	0	137	306
Flint	1	------	0	0	14	17	0	0	0	5	37
Grand Rapids	0	------	2	5	3	13	0	0	0	0	40
Wisconsin:											
Kenosha	0	------	0	1	0	2	0	0	0	9	9
Milwaukee	0	3	2	3	12	68	0	4	0	71	119
Racine	0	------	0	0	2	24	0	0	0	3	11
Superior	0	------	0	0	0	2	0	1	0	0	9
Minnesota:											
Duluth	0	------	0	0	0	0	0	0	0	4	16
Minneapolis	1	------	1	101	9	143	1	1	0	7	111
St. Paul	0	1	1	47	10	56	0	1	0	3	90
Iowa:											
Cedar Rapids	0	------	------	0	------	1	0	------	0	0	------
Davenport	0	------	------	0	------	16	0	------	0	0	------
Des Moines	8	------	------	0	------	2	0	------	0	0	42
Sioux City	0	------	------	0	------	4	4	------	0	0	------
Waterloo	0	------	------	0	------	4	0	------	0	0	------

City reports for week ended Feb. 15, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Missouri:											
Kansas City	5	------	3	3	20	46	1	9	0	0	158
St. Joseph	1	1	0	0	7	12	0	1	0	0	31
St. Louis	15	------	1	2	16	61	0	14	1	6	263
North Dakota:											
Fargo	0	------	0	0	1	8	1	0	0	3	5
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	9	0	0	0	0	6
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	0	0	0	21	0	0	0	0	7
Nebraska:											
Omaha	1	------	0	1	17	99	4	1	0	0	71
Kansas:											
Lawrence	0	------	0	0	0	1	0	0	0	0	------
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	1	------	0	0	7	21	0	3	0	0	40
Delaware:											
Wilmington	0	------	0	1	3	1	0	1	0	6	37
Maryland:											
Baltimore	7	5	0	17	36	29	0	12	0	20	261
Cumberland	0	------	0	0	0	1	0	1	0	0	11
Frederick	0	------	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	18	------	4	21	23	21	0	21	1	9	181
Virginia:											
Lynchburg	1	------	0	3	8	1	0	1	0	6	21
Richmond	2	29	2	0	12	9	0	5	0	0	76
Roanoke	0	------	0	0	1	0	0	0	0	0	24
West Virginia:											
Charleston	0	------	0	1	2	0	0	1	0	0	5
Huntington	0	------	------	0	------	1	0	------	0	0	------
Wheeling	0	------	1	2	1	0	0	1	0	0	20
North Carolina:											
Gastonia	0	1	0	0	1	0	0	0	0	0	6
Raleigh	1	------	0	0	4	0	0	3	0	3	22
Wilmington	0	------	2	1	6	2	0	0	0	0	------
Winston-Salem	0	1	0	89	4	3	0	2	0	0	23
South Carolina:											
Charleston	1	716	4	0	7	3	0	3	0	2	32
Columbia	0	------	0	0	3	0	0	0	0	0	7
Florence	0	------	1	0	6	0	0	0	0	0	16
Greenville	2	------	0	7	0	0	0	1	0	0	23
Georgia:											
Atlanta	6	197	5	0	11	11	0	3	0	0	124
Brunswick	0	1	1	0	4	0	0	0	0	0	11
Savannah	0	169	6	0	1	3	0	2	0	3	40
Florida:											
Miami	1	------	0	0	1	0	0	4	0	3	45
Tampa	1	2	2	0	2	1	0	1	0	0	26
Kentucky:											
Ashland	0	------	------	0	------	0	0	0	1	0	------
Covington	2	------	0	0	2	5	0	0	0	2	14
Lexington	0	------	0	0	7	2	0	2	0	0	19
Louisville	1	7	1	2	17	12	0	2	0	3	83
Tennessee:											
Knoxville	1	7	1	63	6	0	0	0	0	0	33
Memphis	2	------	2	0	19	8	0	5	0	2	91
Nashville	1	------	2	0	4	5	0	0	0	0	41
Alabama:											
Birmingham	1	11	1	0	9	0	0	1	1	0	71
Mobile	2	16	0	0	1	1	0	1	0	0	24
Montgomery	1	10	------	0	------	1	0	------	0	1	------
Arkansas:											
Fort Smith	0	------	------	0	------	2	0	------	0	2	------
Little Rock	0	------	0	0	7	1	0	1	0	0	9
Louisiana:											
Lake Charles	0	2	0	0	1	0	0	0	0	0	9
New Orleans	18	10	2	12	12	16	0	10	0	40	178
Shreveport	0	------	1	17	13	1	0	3	0	0	42
Oklahoma:											
Oklahoma City	0	18	4	1	6	4	0	2	0	6	55
Texas:											
Dallas	2	3	3	28	12	8	0	5	0	0	81
Fort Worth	1	------	0	2	8	11	0	1	0	1	47
Galveston	6	------	0	0	1	1	0	0	0	0	8
Houston	9	------	2	22	17	6	0	7	1	0	93
San Antonio	3	------	4	0	8	10	0	4	0	0	70

City reports for week ended Feb. 15, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
Montana:											
Billings	0	------	0	0	2	3	0	1	0	0	6
Great Falls	0	------	0	1	4	2	1	0	0	7	9
Helena	0	------	0	6	1	1	0	0	0	0	2
Missoula	0	1	1	4	0	5	0	0	0	0	3
Idaho:											
Boise	0	------	0	0	1	3	0	0	0	0	8
Colorado:											
Denver	3	------	1	4	8	21	0	5	0	16	100
Pueblo	0	------	0	0	1	15	0	0	0	3	12
New Mexico:											
Albuquerque	1	------	0	1	4	19	0	3	0	0	16
Utah:											
Salt Lake City	0	------	0	4	3	49	0	0	0	16	42
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	4	47	10	27	0	3	0	3	126
Spokane	0	------	0	2	4	11	0	1	0	2	31
Tacoma	0	------	0	19	1	0	0	0	0	2	32
Oregon:											
Salem	0	7	------	1	------	1	0	------	0	0	------
California:											
Los Angeles	8	311	2	255	24	94	0	26	0	12	350
Sacramento	5	107	3	14	7	11	0	1	0	3	35
San Francisco	0	35	5	400	21	76	0	9	0	23	190

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases	State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:				North Carolina:			
Boston	4	3	0	Raleigh	1	0	0
Worcester	1	0	0	South Carolina:			
New York:				Charleston	10	2	0
Buffalo	0	0	1	Greenville	0	1	1
New York	18	8	0	Georgia:			
New Jersey:				Atlanta	1	1	0
Newark	1	1	0	Kentucky:			
Pennsylvania:				Louisville	3	0	0
Philadelphia	2	1	0	Tennessee:			
Ohio:				Knoxville	3	1	0
Cincinnati	3	0	0	Memphis	0	1	0
Columbus	1	2	0	Alabama:			
Indiana:				Birmingham	1	0	0
Indianapolis	0	1	0	Louisiana:			
Illinois:				New Orleans	2	0	1
Chicago	5	2	1	Shreveport	0	1	0
Springfield	0	1	0	Oklahoma:			
Michigan:				Oklahoma City	1	0	0
Detroit	2	0	0	Texas:			
Minnesota:				Dallas	1	1	0
Minneapolis	7	4	0	Houston	4	1	0
Iowa:				San Antonio	2	0	0
Des Moines	2	0	0	Montana:			
Missouri:				Helena	0	1	0
Kansas City	1	4	0	Colorado:			
St. Joseph	1	0	0	Denver	5	0	0
St. Louis	4	1	1	Utah:			
Nebraska:				Salt Lake	1	0	0
Omaha	2	2	0	Washington:			
Maryland:				Seattle	0	1	1
Baltimore	6	6	0	California:			
District of Columbia:				Los Angeles	2	2	3
Washington	4	1	0				
West Virginia:							
Wheeling	1	0	0				

Epidemic encephalitis.—Cases: Providence, 1; New York, 1.
Pellagra.—Cases: Gastonia, 1; Winston-Salem, 2; Charleston, S. C., 5; Atlanta, 2; Savannah, 2; New Orleans, 1.
Typhus fever.—Cases: Fort Worth, 2.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended February 8, 1936.—During the 2 weeks ended February 8, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	1	1				3
Chicken pox		19	1	399	474	40	52	19	112	1,116
Diphtheria		15		35	9	11	2	16	3	91
Dysentery					2		2			4
Erysipelas				18	4	4		2	4	32
Influenza		9			180	34	604		34	861
Lethargic encephalitis					1					1
Measles	12	44	52	482	3,502	752	1,200	133	527	6,704
Mumps		16			688	102	435	11	250	1,502
Pneumonia	3	3			39		2		24	71
Scarlet fever	3	15	3	304	489	89	48	84	79	1,114
Trachoma							4		1	5
Tuberculosis	3	69	10	97	86	8	4	5	26	308
Typhoid fever				23	2	3	2	2	1	33
Undulant fever					4					4
Whooping cough	10	95	188	152	550	58	88	12	66	1,169

CUBA

Habana—Communicable diseases—4 weeks ended February 15, 1936.—During the 4 weeks ended February 15, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	23	1	Tuberculosis	26	8
Malaria	[1] 40		Typhoid fever	[1] 25	
Scarlet fever	1				

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended February 8, 1936.—During the 4 weeks ended February 8, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2			8	1		11
Chicken pox	1	18	2		1	10	32
Diphtheria		1	2	3	1	4	11
Hookworm disease		1				11	12
Leprosy		2		2	4	1	9
Malaria	78	87	22	585	277	1,131	2,180
Measles	2	4			2		8
Poliomyelitis				4		7	11
Tuberculosis	13	42	12	25	18	48	158
Typhoid fever	6	37	5	24	3	33	108

SPAIN

Communicable diseases—Year 1935.—During the year 1935, certain communicable diseases were reported in Spain as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Poliomyelitis	310	32	Typhoid fever	17,138	1,823
Rabies		28	Typhus fever	1	
Smallpox	26	2	Varioloid	257	

STRAITS SETTLEMENTS

Singapore—Malaria.—During the week ended November 30, 1935, 23 deaths from malaria were reported in Singapore, Straits Settlements, and for the week ended December 7, 1935, 38 deaths from the same disease were reported. The following table shows the numbers of deaths from malaria in Singapore for the first 11 months of 1934 and 1935:

	1934	1935		1934	1935
January	38	31	August	31	59
February	20	41	September	44	60
March	19	48	October	38	90
April	21	79	November	52	83
May	40	99			
June	25	57	Total	361	705
July	33	58			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for February 28, 1936, pages 227–240. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued March 27, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Yellow Fever

Brazil—Minas Geraes State—Passos.—On January 31, 1936, 1 case of yellow fever with 1 death was reported at Passos, Minas Geraes State, Brazil.

Colombia.—During the month of December 1935, yellow fever was reported in Colombia as follows: Acacias, Intendencia of Meta, 3 cases; Department of Boyaca, Muzo, 1 case.

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UNITED STATES PUBLIC HEALTH SERVICE

W. F. DRAPER, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 39; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 MARCH 13, 1936 No. 11

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

January 26–February 22, 1936

Meningococcus meningitis.—As expected, the number of cases of meningococcus meningitis increased during the current 4-week period. Each geographic section except the South Central reported an increase over the preceding 4-week period. In the South Central sections, a 20 percent decrease was reported for the current period. For the 4 weeks ended February 22 the number of cases for the entire reporting area was 800, which was more than 1.5 times the number reported for the corresponding period in 1935 and about 3.5 times the incidence in 1934. The current incidence was the highest for this period since 1930, when 1,001 cases were reported.

Each geographic area except the East and West North Central reported an increase over the corresponding period last year; in the North Central sections the incidence dropped to the level of last year. Since this disease was unusually prevalent during the entire year of 1935, an increase over the figures for that year places the current incidence at a very high level in comparison with preceding years. In the New England and Middle Atlantic, West North Central, and Mountain and Pacific sections the current incidence was the highest for this period since 1931; in the East North Central it was the highest since 1930; while in the South Atlantic and South Central regions the incidence was the highest in the 8 years for which data are available.

States from which a large number of cases were reported were New York, 74; Virginia, 63; Illinois, 50; Oklahoma, 48; Kentucky, 46; Texas and Maryland, 45 each; Ohio, 41; and Tennessee, 37.

Influenza.—The number of influenza cases rose from 9,901 for the preceding 4-week period to 28,549 for the 4 weeks ended February 22. Each section of the country contributed to the increase, but the sharpest rises were reported from the Mountain, East South Central, and South Atlantic sections. Only certain States, however, were apparently mostly responsible for the high incidence in those sections.

[1] From the Office of Statistical Investigations, U S Public Health Service These summaries include only the 8 important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers The numbers of States included for the various diseases are as follows Typhoid fever, 48, poliomyelitis, 48, meningococcus meningitis, 48, smallpox, 48, measles, 47; diphtheria, 48, scarlet fever, 48, influenza, 44 States and New York City. The District of Columbia is counted as a State in these reports.

California, in the Pacific section, reported [illegible],571 cases for the current 4 weeks; Alabama (East South Central), 2,510 cases; Georgia and South Carolina (South Atlantic), 2,456 and 4,391, respectively. Approximately two-thirds of the total cases occurred in those 4 States.

Compared with recent years the current incidence of influenza was about 80 percent of that for the corresponding period last year, when the minor epidemic of 1934–35 reached its peak during this period, but it was more than twice the incidence in 1934, which was a low influenza year. The number of cases in the Mountain and Pacific sections (10,662) was 1.8 times that of last year; the incidence in the South Atlantic, New England, and Middle Atlantic sections closely approximated the figures of last year, while in each of the remaining sections the number of cases was less than 50 percent of that of last year.

Smallpox.—Smallpox, which has been at the highest level in recent years, declined slightly during the current period. For the 4 weeks ended February 22 the number of cases totaled 754, as compared with 883, 607, and 748 for the corresponding period in the years 1935, 1934, and 1933, respectively. The highest incidence was still reported from States in the Mountain and Pacific and the North Central regions. Of the total cases, Nebraska reported 160; Washington, 68; South Dakota, 65; Wisconsin, 53; Kansas, 50; Colorado, 49; Iowa, 48; and Montana, 39. More than two-thirds of the cases occurred in these 8 States. One case was reported from the New England and Middle Atlantic region (Vermont); 4 cases were reported from the South Atlantic, as compared with 3 last year; and 19 from the South Central regions as against 235 (211 from Texas) for the corresponding period last year.

Scarlet fever.—For the country as a whole 29,134 cases of scarlet fever were reported for the current 4-week period, which was the highest incidence for this period in recent years. The West North Central and the Mountain and Pacific regions, where the disease has been unusually prevalent, reported a decline from the preceding 4-week period, but the number of cases was 2.3 and 1.5 times, respectively, the figures for those regions for the corresponding period last year, and in each region the incidence was the highest in the 8 years for which data are available. In the New England and Middle Atlantic and East North Central regions the disease continued to increase, and in the former area the number of cases was about 15 percent in excess of that for last year, while in the latter the incidence was only about 75 percent of that for last year. In the South Central regions the incidence was about normal, while in the South Atlantic region it was somewhat below the expectancy. In preceding years the peak of scarlet fever was most frequently reached during the month of March.

Diphtheria.—For the current 4-week period 2,369 cases of diphtheria were reported. In 1935, 1934, and 1933 the numbers of cases reported for this period were 2,874, 3,381, and 3,187, respectively. The South Atlantic region reported a slight increase over the incidence during this period last year and in the New England and Middle Atlantic area the current incidence closely approximated that of last year; in all other regions the disease was considerably less prevalent. All regions except the South Atlantic reported the lowest incidence in recent years.

Poliomyelitis.—As would be expected at this season, the number of cases of poliomyelitis continued to decline. For the 4 weeks ended February 22 the number of cases totaled 66, which was about 70 percent of the number reported for the corresponding period in 1935 and the same number as was reported for this period in 1934. In the New England and Middle Atlantic and the South Central regions the incidence was about on a level with that of the corresponding period in 1935; in the West North Central region, 10 cases were reported as against 5 last year. All other regions reported considerable decreases from the figures for this period last year. This disease usually reaches its lowest level during March or April.

Measles.—The reported cases of measles rose from 18,801 for the 4 weeks ended January 25 to 28,865 for the current 4-week period, an increase of approximately 10,000 cases. Each section of the country contributed to the increase. Compared with preceding years, the current incidence for the country as a whole was about 30 percent of that for the corresponding period in each of the years 1935 and 1934, and about 70 percent of the average for the more normal measles years, 1929 to 1933, inclusive. The disease was unusually prevalent in the Mountain and Pacific regions. While the number of cases in this area (9,756) did not reach the level of 1934 (11,276 cases), it was almost 1.4 times that reported for the same period last year and more than double the incidence in each of the years 1933 and 1932. In the regions along the Atlantic Coast the current incidence was the lowest since 1930; in the North Central region it was the lowest in the 8 years for which data are available; while in the South Central regions the incidence dropped to the level of 1932.

Typhoid fever.—For the 4 weeks ended February 22 the number of cases of typhoid fever totaled 364, as compared with 521, 619, and 481 for the corresponding period in the years 1935, 1934, and 1933, respectively. For the country as a whole, as well as for each geographic region except the West North Central and the Mountain and Pacific regions, the current incidence was the lowest in the 8 years for which data are available. In the West North Central region the number of cases (42) represented about a 50 percent increase over the incidence during this period in 1935, but it was below the average

DETERMINATION OF THE "TEST DOSE" OF TOXIN

Following the method of Madsen in determining the "test dose" of toxin, solutions were prepared as follows:

a. One cubic centimeter of the standard antitoxin was diluted to 100 cc so that 1 cc of the solution contained 0.2 of a provisional international unit.

b. The toxin was diluted so that 1 cc contained 20 mg.

In accordance with directions, the "mixtures of standard antitoxin solution and toxin solution are prepared in such a manner that 0.2 cc (the quantity to be injected in mice) contains 0.1 cc of the antitoxin solution (=0.02 P. unit)+varying quantities of the toxin solution.

"The mixtures are kept at the ordinary room temperature for 1 hour, following which they are injected intramuscularly in mice (0.2 cc). The animals are under observation for 3 days after the injection."

As a preliminary test, doses of toxin varying by 0.2 mg and ranging from 1.0 to 3.0 mg were tested against 0.02 of the provisional unit, using three mice on a dose. The results are shown in table 1.

TABLE 1.—*Preliminary test for determination of the "test dose" of toxin. Antitoxin constant (0.02 provisional unit); toxin varied*

Toxin 1 (milligrams)	Number of mice	Number dead	Number surviving	Proportion surviving
1.0	3	0	3	3/3
1.2	3	0	3	3/3
1.4	3	0	3	3/3
1.6	3	0	3	3/3
1.8	3	0	3	3/3
2.0	3	3	0	0/3
2.2	3	3	0	0/3
2.4	3	3	0	0/3
2.6	3	3	0	0/3
2.8	3	3	0	0/3
3.0	3	3	0	0/3

The results of the test indicate that the "test dose" of toxin lies in the neighborhood of 2 mg. In a second test, in which seven mice were used on a dose, the "test dose" was at 2 mg, some of the mice dying and some surviving on this dose (table 2).

TABLE 2.—*Determination of the "test dose" of toxin. Antitoxin constant (0.02 provisional unit); toxin varied*

Toxin 1 (milligrams)	Number of mice	Number dead	Number surviving	Proportion surviving
1.8	7	1	6	6/7
2.0	7	2	5	5/7
2.2	7	7	0	0/7

As a further check on the correctness of the test, the "test dose" of toxin was titrated against varying doses of antitoxin (table 3). Again some mice died and some survived on the dose of 0.02 unit of antitoxin.

TABLE 3.—*Determination of the "test dose" of toxin. Antitoxin varied; toxin constant (2.0 mg)*

Antitoxin (P. units)	Number of mice	Number dead	Number surviving	Proportion surviving
0.022 (0.11 cc of 1/100 dilution)	7	1	6	6/7
0.02 (0.10 cc of 1/100 dilution)	7	6	1	1/7
0.018 (0.09 cc of 1/100 dilution)	7	7	0	0/7

DETERMINATION OF PROVISIONAL UNITS IN A SAMPLE OF ANTITOXIN OF UNSTATED POTENCY

A test was made to determine the number of P. units contained in a sample of *oedematiens* antitoxin of unknown potency, submitted by Dr. Madsen. The potency was stated to lie between 300 and 400 units. The serum was therefore diluted on the basis of 350 units per cc, and varying amounts of this dilution were tested against the "test dose" of toxin (2 mg) (table 4). The results obtained indicate that the specimen contained 318 to 350 units of antitoxin per cc. Several tests were carried out in which it was attempted to obtain results for differences of 5 percent in the doses, but this was not found practicable. Apparently the test is not accurate for differences less than 10 percent. The results obtained in this test agree well with those obtained by the five other laboratories cooperating in the tests. The results reported by the other laboratories were 304–324, 300–325, 320, 325–330, and 330 units.

TABLE 4.—*Determination of P. units in a sample of antitoxin of unknown potency*

Number of P. units tested for	Antitoxin diluted 1/1750	Toxin	Number of mice	Number dead	Surviving	
					Number	Proportion
	Cc	*Mg*				
437	0.08	2.0	7	7	0	0/7
390	.09	2.0	7	6	1	1/7
350	.10	2.0	7	6	1	1/7
318	.11	2.0	7	1	6	6/7
292	.12	2.0	7	0	7	7/7
STANDARD DILUTED 1/100						
20	0.10	2.0	7	2	5	5/7

INTRACUTANEOUS TESTS ON GUINEA PIGS

In addition to the mouse tests recommended by Madsen, the method of intracutaneous testing on guinea pigs was made use of as was done in the standardization of gas gangrene antitoxin (*Vibrion septique*).

The standard antitoxin was diluted as for the mouse test, i. e., so that 1 cc contained 0.2 unit. A preliminary test was done to determine the method of diluting the toxin suitable for performing the test. Two dilutions, one containing 20 mg and one containing 30 mg were made.

The results using 20 mg per cc against 0.2 of the provisional unit were negative. With 30 mg per cc tested against the same amount of antitoxin, positive results were obtained with doses of 0.08 cc and above, while a slight reaction was obtained with 0.07 cc, and negative results with doses below this. A closer titration showed the test dose to be 0.075 cc of the dilution of toxin containing 30 mg per cc (table 5).

TABLE 5.—*Intracutaneous testing on guinea pigs. Determination of the "test dose" of toxin. Antitoxin constant (0.02 provisional unit); toxin varied*

Toxin 1 diluted to 30 mg per cc	24 hours	48 hours	72 hours
Cc			
0.085	+++	+++	++++
.08	+++	+++	+++
.075	++	++	++
.07	+	++	++
.065	±	+	+

+++ large reaction; necrosis.
++ moderate reaction; slight necrosis.
+ small reaction
± indefinite.
− negative.

As in the mouse test, the results obtained were checked by testing varying doses of antitoxin against the test dose of toxin. The results are shown in table 6. The dose of 0.02 unit of antitoxin produced a definite reaction, that of 0.022 unit was less marked, and that of 0.024 was practically negative, while the reactions with 0.018 and 0.016 unit were very marked.

TABLE 6.—*Intracutaneous testing on guinea pigs. Determination of the "test dose" of toxin. Antitoxin varied; toxin constant (0.075 cc of toxin diluted to 30 mg per cc)*

Antitoxin, P. units	24 hours	48 hours	72 hours
0.024 (0.12 cc of 1/100 dilution)	+	+	+
0.022 (0.11 cc of 1/100 dilution)	+	++	++
0.02 (0.10 cc of 1/100 dilution)	++	++	++
0.018 (0.09 cc of 1/100 dilution)	+++	+++	+++
0.016 (0.08 cc of 1/100 dilution)	+++	++++	++++

The slight reactions given by the smallest dose of toxin consisted of a small inflamed area about 0.2 cm in diameter and those on the next larger dose consisted of a larger inflamed area, about 0.5 cm in diameter. The dose which was adopted as the "test dose" of toxin showed a larger inflamed area, about 1 cm in diameter, and some necrosis. The reactions with still larger doses of toxin showed extensive inflammatory areas and marked necrosis.

The antitoxin of unknown potency was tested against the "test dose" of toxin, the antitoxin being diluted as for the mouse test and testing being made against 0.075 cc of the solution of toxin containing 30 mg per cc. The results agree well with those obtained in the mouse test and indicate a potency between 318 and 350 units per cc (table 7).

TABLE 7.—*Determination of P. units in a sample of oedematiens antitoxin of unknown potency. (Intracutaneous testing of guinea pigs.)*

Number of P units tested for	Antitoxin diluted 1/1750	Toxin diluted to 30 mg per cc	24 hours	48 hours	72 hours
	Cc	*Cc*			
437	0.08	0 075	++	++++	++++
390	.09	075	+	++++	++++
350	10	075	±	+	++
318	.11	.075	±	±	±+
292	.12	.075	±	±	±
STANDARD ANTITOXIN DILUTED 1/100					
20	.10	0 075	±	++	++

THE INTERNATIONAL UNIT

The results of the various laboratories participating in the international tests, using the reagents and the serum of unknown potency furnished by the Statens Seruminstitut, confirmed those obtained at that institute. It was therefore recommended at a meeting of the Permanent Commission on Biological Standardization of the Health Organization of the League of Nations held at Copenhagen from August 28 to 30, 1934, "that the dry stable standard gas gangrene antitoxin (*oedematiens*) prepared at the Statens Seruminstitut, Copenhagen, be accepted as the international standard for this antitoxin and that the specific antitoxic activity contained in 0.2681 mg of the dry standard preparation be defined as the international unit" (1).

THE UNITED STATES STANDARD ANTITOXIN

Antitoxin suitable for use as a standard was not available at the time of making the international tests. Later, however, 2 liters of *oedematiens* antitoxin without preservative were obtained from the Lederle Laboratories, Inc. This was measured accurately in 10 cc

amounts into 30 cc pyrex glass ampuls. After drying in vacuum jars over phosphorus pentoxide, small agglutination tubes containing phosphorus pentoxide were placed in each ampul and the ampuls were filled with nitrogen and sealed.

The contents of one ampul was dissolved in salt solution (0.85 percent) and made up to 100 cc. One cc amounts of this were diluted 1/50 and 1/100 for preliminary titration. The dilution of 1/50 was found to be too concentrated. Using the 1/100 dilution, the dose of antitoxin was fixed at about 0.07 cc against the "test dose" of toxin as shown in table 8.

TABLE 8.—*Determination of the amount of the United States standard antitoxin equivalent to the international unit of antitoxin. Toxin constant (2.0 mg).*

Amount of antitoxin	Number of mice	Number dead	Number surviving	Proportion surviving
0.08 cc of 1/10000 dilution	7	1	6	6/7
0.07 of 1/10000 dilution	7	4	3	3/7
0.06 of 1/10000 dilution	7	6	1	1/7

In accordance with these results, the antitoxin in one of the ampuls containing the dried residue of 10 cc of serum was diluted so that the amount corresponding to 0.02 of the international unit would be contained in 0.1 cc. The dilution was made as follows:

Contents of ampul was diluted to 143 cc with 66⅔ percent glycerin and 33⅓ percent salt solution.

1 cc of 1/143 dilution diluted 1/100.

1 cc of 1/100 dilution contains 0.2 international unit.

A test was carried out with the 1/100 dilution using varying doses of the antitoxin against the "test dose" of toxin. A parallel test was made using the international standard. The results of this test are shown in table 9.

TABLE 9.—*Determination of the amount of the United States standard equivalent to the international unit of antitoxin. Toxin constant (2.0 mg)*

Units of antitoxin	Amount of dilution	Number of mice	Number dead	Number surviving	Proportion surviving
UNITED STATES					
0.024	Cc. 0.12	6	0	6	6/6
0.02	.10	6	2	4	4/6
0.016	.08	6	6	0	0/6
INTERNATIONAL					
0.024	.12	6	0	6	6/6
0.02	.10	6	1	5	5/6
0.016	.08	6	5	1	1/6

The results of the test show close agreement between the United States and the international standards. On the basis of the tests

made, the dried residue of the 10 cc of serum in the ampul contained 2,860 units.

The weights of the dried residue contained in 5 ampuls were determined, with the following results: 0.9811 gram, 0.9871 gram, 0.9830 gram, 0.9847 gram, and 0.9834 gram. The average weight was 0.9838 gram, and the largest deviation from the mean was 0.33 percent. Calculating from the average weight, 0.9838 gram, one unit is contained in 0.3440 milligram. This amount is therefore equivalent to 0.2681 milligram of the international standard.

In accordance with the international agreement regarding the size of the unit, the following statement was issued by the National Institute of Health, Washington:

NATIONAL INSTITUTE OF HEALTH
TWENTY-FIFTH AND F STREETS NW.
WASHINGTON, D. C.

October 31, 1935.

It is proposed to adopt as the official unit for the measurement of the potency of oedematiens antitoxin the equivalent of the international unit adopted by the Permanent Commission on Biological Standardization of the Health Organization of the League of Nations, this unit being that amount of antitoxin contained in a specified amount of the international standard serum. The equivalent of the international unit is that amount of antitoxin contained in 0.3440 milligram of the dried standard serum prepared at the National Institute of Health. The dried serum as dissolved and diluted for distribution contains 20 units in 1 cc.

The standard unit will be distributed on special request addressed to the Director of the National Institute of Health.

It is expected that this unit will be employed by all producers not later than April 1, 1936.

G. W. McCOY,
Director, National Institute of Health.

SUPPLEMENTAL

POTENCY OF COMMERCIAL AND OTHER ANTITOXINS

A number of antitoxins were available for test. These included 6 commercial antitoxins, of which 4 were monovalent and 2 polyvalent (containing antitoxins against several other anaerobic toxins), 2 from the Pasteur Institute and 1 from Dr. Sordelli of the Argentine Republic. These were tested against the "test dose" of the United States toxin with the following results:

(1) 20–40 units per cubic centimeter.
(2) 20 units per cubic centimeter.
(3) 200 units per cubic centimeter.
(4) 140 units per cubic centimeter.
(5) 90 units per cubic centimeter.
(6) 40–80 units per cubic centimeter.
(7) 5 units per cubic centimeter.
(8) 10 units per cubic centimeter.
(9) over 200 units per cubic centimeter.

"TEST DOSE" OF VARIOUS TOXINS

Four toxins received from Great Britain, Argentine Republic, France, and Denmark, respectively, were tested to determine the "test dose" against 0.02 unit of the international standard. The approximate minimal lethal dose of the toxins was also determined. The number of minimal lethal doses in the "test doses" of the various toxins were calculated from these figures. The results are shown in table 10.

TABLE 10.—*"Test dose" and approximate minimal lethal dose of various toxins*

Toxin	"Test dose"	Minimal lethal dose	Number of minimal lethal doses per "test dose"	Toxin	"Test dose"	Minimal lethal dose	Number of minimal lethal doses per "test dose"
	Mg.	*Mg*			*Mg.*	*Mg.*	
1	1 6	0 03	53	4	5 0	0.16	31
2	.25	.01	25	United States	2.0	.02	100
3	.45	.008	56				

DETERIORATION OF TOXIN

Some tests were made to determine the effect of variations of temperature and light on the toxin. Specimens of the dried toxin were placed in 4 dry, stoppered bottles and exposed to the following conditions:

(1) In warm room (37.5° C.) in the dark.
(2) At room temperature in the dark.
(3) Exposure to sunlight outside window.
(4) Storage in cold room (4° to 5° C.) in vacuum jar.

After being retained for 4 months under the conditions described, the toxins were tested against 0.02 unit of the international standard. The amounts of toxin which when mixed with the dose of antitoxin used caused the death of some of the mice and allowed others to survive were as follows:

	Mg.
Warm room in the dark	2. 8
Room temperature in the dark	2. 8
Exposure to sunlight outside window	2. 4
Storage at 4° to 5° C. *in vacuo*	2. 0

Curiously, the specimen exposed to sunlight outside the window showed less deterioration than those maintained indoors. However, the experiment was carried out during the winter months when the outside temperature was much lower than that indoors. The same specimen was exposed further to the action of the sunlight and to heat during the 3½ months from April to July. After this length of time a dose of 4.2 mg was necessary to cause the death of some of the mice. The results of the experiments indicate that temperature is a more important factor in the deterioration of the toxin than light.

SUMMARY

Tests were carried out in cooperation with the laboratories of 5 other countries, using reagents furnished by the Statens Seruminstitut of Denmark, with a view to establishing an international standard for measuring the potency of gas gangrene antitoxin (*oedematiens*). The proposed international unit was contained in 0.2681 milligram of the dried serum preparation of the Statens Seruminstitut of Denmark. This unit was adopted as the international unit at a meeting of the Permanent Commission on Biological Standardization held at Copenhagen from August 28 to 30, 1934.

A dried serum to be used as the standard for the United States was prepared and its potency determined in terms of the international unit. The equivalent of the international unit was found to be contained in 0.3440 milligram of the dried serum prepared at the National Institute of Health. The equivalent unit was adopted as the United States official unit in October 1935.

The results obtained in the evaluation of an antitoxin of unknown potency submitted by the Statens Seruminstitut of Denmark agreed well with those obtained by the other 5 laboratories cooperating in the tests. The potency of several commercial antitoxins was also determined in terms of the international unit.

The minimal lethal doses of several specimens of toxin and the relation of these to the "test doses" of these toxins against 0.02 of the international unit were determined. The "test dose" of the United States toxin was found to contain 100 minimal lethal doses.

Tests were carried out to determine the amount of deterioration of the toxin when subjected to varying conditions of light and temperature. High temperatures were found to be a greater factor in the deterioration than light.

REFERENCE

(1) Quarterly bulletin of the Health Organization, League of Nations, Special Number, January 1935

DEATHS DURING WEEK ENDED FEBRUARY 22, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb 22, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	10,041	8,693
Deaths per 1,000 population, annual basis	14.0	12.1
Deaths under 1 year of age	567	562
Deaths under 1 year of age per 1,000 estimated live births	51	53
Deaths per 1,000 population, annual basis first 8 weeks of year	13.5	12.9
Data from industrial insurance companies		
Policies in force	67,968,255	67,251,397
Number of death claims	14,928	12,900
Death claims per 1,000 policies in force, annual rate	11.5	10.0
Death claims per 1,000 policies, first 8 weeks of year, annual rate	10.6	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended February 29, 1936, and March 2, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 29, 1936, and Mar. 2, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935
New England States:								
Maine		2	5	15	255	221	0	0
New Hampshire			1		13	30	0	0
Vermont		1			496	3	0	0
Massachusetts	8	17			916	531	12	1
Rhode Island		3			43	68	1	0
Connecticut	4	5	17	32	91	785	2	1
Middle Atlantic States:								
New York	51	34	[1] 78	[1] 20	2,636	2,111	27	14
New Jersey	16	30	62	28	159	842	7	3
Pennsylvania	41	68			797	4,620	6	9
East North Central States:								
Ohio	35	78	127	174	421	1,390	12	14
Indiana	27	38	48	115	40	528	1	9
Illinois	39	44	42	71	28	2,802	16	20
Michigan	7	6	10	17	44	2,314	4	2
Wisconsin	2	1	64	196	84	2,141	3	0
West North Central States:								
Minnesota	3	2	2	41	289	2,452	1	3
Iowa	15	10	6	99	4	1,481	3	1
Missouri	19	49	650	355	20	662	12	10
North Dakota	5	2	12	9		49	0	3
South Dakota	3	2	2			14	2	0
Nebraska	9	8			39	468	0	2
Kansas	15	19	32	29	12	1,552	3	3
South Atlantic States:								
Delaware		2			66	5	1	0
Maryland [3]	0	9	72	53	146	62	11	4
District of Columbia	22	25	2	3	25	13	7	6
Virginia	11	14			86	916	48	1
West Virginia	12	16	218	236	21	448	9	1
North Carolina [3]	16	19	482	174	55	787	8	2
South Carolina	3	3	1,509	534	12	72	16	7
Georgia [3]	6	8	1,819	304			9	0
Florida [3]	8	4	33	49	6	102	2	2

[1] footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 29, 1936, and Mar. 2, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 29, 1936	Week ended Mar 2, 1935	Week ended Feb 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935
East South Central States:								
Kentucky	16	15	80	117	73	1,001	42	2
Tennessee	14	12	338	175	52	41	0	6
Alabama [3]	28	15	2,383	889	5	463	1	2
Mississippi [3]	4	2					3	4
West South Central States:								
Arkansas	3	3	140	113	2	58	3	2
Louisiana	15	23	78	37	51	131	8	1
Oklahoma [4]	10	12	256	244	13	54	10	2
Texas [3]	15	56	655	897	418	187	5	10
Mountain States:								
Montana	1	5	45	320	16	180	1	3
Idaho			3	1	15	82	0	0
Wyoming	1				8	104	0	1
Colorado	4	18			9	736	2	1
New Mexico	9	8	8	30	18	15	1	1
Arizona	5	1	304	38	37	26	0	1
Utah [3]	1				1	12	1	0
Pacific States:								
Washington	1	3	4	1	261	132	1	0
Oregon	2	2	267	109	733	116	0	0
California	33	46	1,661	202	1,890	564	11	4
Total	548	780	11,515	5,727	10,396	31,371	307	154
First 9 weeks of year	5,918	6,989	49,965	75,528	58,065	177,695	1,775	987

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb 29, 1936	Week ended Mar 2, 1935	Week ended Feb 29, 1936	Week ended Mar. 2, 1935
New England States:								
Maine	1	0	14	21	0	0	0	2
New Hampshire	0	0	3	13	0	0	0	0
Vermont	0	0	19	13	0	0	1	1
Massachusetts	0	2	285	220	0	0	3	1
Rhode Island	0	0	35	12	0	0	0	0
Connecticut	1	0	89	67	0	0	1	2
Middle Atlantic States.								
New York	1	2	1,277	948	0	0	6	10
New Jersey	1	0	520	160	0	0	3	0
Pennsylvania	1	2	512	720	0	0	1	6
East North Central States.								
Ohio	0	1	491	1,282	0	0	5	3
Indiana	0	0	344	308	1	1	8	5
Illinois	0	1	969	1,199	6	4	2	6
Michigan	0	0	397	408	0	0	1	0
Wisconsin	0	0	615	572	15	15	0	0
West North Central States:								0
Minnesota	0	0	372	149	3	14	1	
Iowa	0	1	106	73	20	4	3	4
Missouri	0	0	219	98	17	3	2	2
North Dakota	0	0	124	63	17	0	0	0
South Dakota	0	0	62	8	81	3	1	1
Nebraska	0	2	228	36	23	30	0	0
Kansas	0	1	326	95	47	6	1	0
South Atlantic States:								
Delaware	0	0	9	26	0	0	0	0
Maryland [3]	0	1	96	93	0	0	3	3
District of Columbia	0	0	30	55	0	0	1	0
Virginia	1	0	57	50	0	0	2	9
West Virginia	0	0	44	125	1	0	1	3
North Carolina [3]	1	1	24	37	0	0	0	1
South Carolina	0	0	5	2	0	0	0	1
Georgia [4]	0	0	24	4	1	0	1	3
Florida [3]	0	1	4	4	0	0	0	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Feb. 29, 1936, and Mar. 2, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935	Week ended Feb. 29, 1936	Week ended Mar. 2, 1935
East South Central States:								
Kentucky	1	0	76	52	0	0	0	8
Tennessee	0	0	24	28	0	0	1	1
Alabama [3]	8	1	30	10	0	0	5	3
Mississippi [2]	0	0	14	12	0	3	1	3
West South Central States:								
Arkansas	1	0	9	8	1	1	4	0
Louisiana	0	2	19	12	3	2	3	7
Oklahoma [4]	1	0	22	39	8	1	2	2
Texas [3]	0	1	38	82	0	7	4	7
Mountain States:								
Montana	0	0	137	8	8	7	1	1
Idaho	0	0	92	4	4	0	1	0
Wyoming	0	0	127	9	1	2	0	0
Colorado	0	0	154	314	8	0	2	3
New Mexico	0	1	112	13	0	1	4	7
Arizona	0	0	84	10	2	0	2	0
Utah [2]	0	0	143	92	1	0	0	0
Pacific States:								
Washington	0	1	81	65	13	11	1	1
Oregon	1	0	34	49	1	0	0	1
California	8	11	410	303	1	1	4	2
Total	17	33	8,777	7,961	233	125	88	111
First 9 weeks of year	187	249	66,169	60,068	2,028	1,759	973	1,261

[1] New York City only
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Feb. 29, 1936, 12 cases, as follows. North Carolina, 1; Georgia, 4; Florida, 1; Alabama, 5, Texas, 1.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
December 1935										
Arizona	2	34	267	2	8		1	126	0	0
January 1936										
Arizona	6	37	599		36	2	0	180	0	1
California	31	229	505	8	4,461	6	17	1,867	30	35
Montana	3	12	157		120		0	805	80	7
Nevada	1	5	25		17		0	76	4	1
New Hampshire		4					0	40	0	0
New York	85	177		10	4,223		9	3,565	0	29
North Dakota	2	4	31		47		0	261	56	1
Oklahoma [1]	48	54	843	44	5		1	165	1	12
Pennsylvania	20	224			1,811	1	6	2,184	0	30
Washington	5	9	64		890		1	416	86	9
Wisconsin	8	11	204		392		1	2,385	71	7

December 1939

	Cases
Arizona:	
Chicken pox	169
Dysentery	10
German measles	12
Mumps	229
Septic sore throat	4
Trachoma	26
Whooping cough	23

January 1940

	Cases
Actinomycosis:	
California	1
Anthrax:	
New York	1
Pennsylvania	2
Chicken pox:	
Arizona	175
California	3,117
Montana	213
Nevada	14
New York	3,496
North Dakota	77
Oklahoma [1]	98
Pennsylvania	4,796
Washington	489
Wisconsin	3,159
Dysentery:	
Arizona	19
California (amoebic)	8
California (bacillary)	3
Montana (bacillary)	1
New York (bacillary)	16
Oklajoma [1]	4
Washington (amoebic)	1
Epidemic encephalitis:	
Arizona	2
California	9
New York	9
Oklahoma [1]	1
Washington	1
Wisconsin	2
Food poisoning:	
California	12
German measles:	
Arizona	18
California	816

January 1940—Continued

	Cases
German measles—Con.	
Montana	20
New York	282
Pennsylvania	409
Washington	213
Wisconsin	122
Granuloma, coccidioidal:	
California	6
Hookworm disease:	
California	1
Impetigo contagiosa:	
Washington	3
Jaundice, epidemic:	
California	2
Leprosy:	
California	3
Mumps:	
Arizona	369
California	2,459
Montana	1,006
Nevada	20
North Dakota	672
Oklahoma [1]	52
Pennsylvania	2,583
Washington	516
Wisconsin	4,767
Ophthalmia neonatorum:	
California	4
New York	5
Oklahoma [1]	2
Pennsylvania	7
Paratyphoid fever:	
California	4
New York	4
Rabies in animals:	
California	122
New York [2]	5
Washington	4
Rocky Mountain spotted fever:	
Pennsylvania	1
Scabies:	
Oklahoma [1]	6
Septic sore throat:	
Arizona	5
California	16
Montana	9

January 1940—Continued

	Cases
Septic sore throat—Con.	
New York	94
North Dakota	2
Oklahoma [1]	20
Washington	1
Wisconsin	18
Tetanus:	
California	5
New York	3
Trachoma:	
Arizona	23
California	15
Montana	1
North Dakota	2
Oklahoma [1]	10
Trichinosis:	
California	11
New York	37
Pennsylvania	10
Tularaemia:	
Montana	1
Pennsylvania	2
Wisconsin	3
Typhus fever:	
Arizona	1
New York	2
Undulant fever:	
Arizona	2
California	18
New York	18
Oklahoma [1]	5
Pennsylvania	6
Washington	3
Wisconsin	5
Vincent's infection:	
New York [2]	79
North Dakota	3
Oklahoma [1]	3
Whooping cough:	
Arizona	23
California	831
Montana	100
New York	1,463
North Dakota	2
Oklahoma [1]	38
Pennsylvania	1,329
Washington	88
Wisconsin	670

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Feb. 22, 1930

This table summarizes the reports received weekly from a selected list of 1[illegible] cities for the purpose of showing a cross-section of the current urban incidence of the communicable [illegible]
Weekly reports are received from about 700 cities, from which the data are [illegible]

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Maine:											
Portland	0	------	0	0	5	1	0	2	0	7	21
New Hampshire:											
Concord	0	------	1	0	2	1	0	1	0	0	20
Manchester	0	------	0	1	8	4	0	0	0	0	28
Nashua	0	------	------	1	------	0	0	------	4	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	0	9
Rutland	0	------	0	11	1	5	0	0	0	0	5
Massachusetts:											
Boston	4	------	1	156	34	71	0	11	0	3	263
Fall River	0	------	2	0	3	9	0	0	0	6	46
Springfield	0	------	0	8	10	4	0	1	0	7	47
Worcester	0	------	0	0	8	20	0	2	0	4	58
Rhode Island.											
Pawtucket	0	------	0	0	0	0	0	0	0	0	15
Providence	0	------	2	12	14	12	0	0	0	6	77
Connecticut:											
Bridgeport	0	------	2	8	8	2	0	1	0	5	43
Hartford	0	------	0	4	13	4	0	1	0	0	48
New Haven	0	1	0	1	6	1	0	1	0	23	51
New York:											
Buffalo	0	------	0	25	15	86	0	6	0	18	147
New York	33	92	14	979	309	358	0	102	2	57	1,990
Rochester	0	------	0	1	10	3	0	2	0	1	92
Syracuse	0	------	0	77	3	4	0	0	0	15	[illegible]
New Jersey:											
Camden	4	0	1	1	3	1	0	1	0	2	28
Newark	0	3	2	7	14	115	0	3	2	14	89
Trenton	0	------	0	1	5	2	0	1	0	13	33
Pennsylvania:											
Philadelphia	8	8	4	313	50	83	0	24	0	61	548
Pittsburgh	11	0	3	20	45	78	0	5	0	9	205
Reading	0	------	0	2	4	11	0	1	0	4	32
Scranton	1	------	------	48	------	10	0	------	0	0	------
Ohio.											
Cincinnati	4	7	2	1	21	19	0	9	0	0	157
Cleveland	8	36	1	103	30	43	0	12	0	72	225
Columbus	1	1	1	2	13	16	0	3	0	2	99
Toledo	0	2	1	34	9	10	0	5	0	10	68
Indiana:											
Anderson	2	------	0	0	3	2	0	0	0	9	11
Fort Wayne	2	------	0	0	1	5	0	0	0	0	20
Indianapolis	3	------	2	1	30	44	0	3	0	21	113
Muncie	0	------	0	0	1	0	0	0	0	------	5
South Bend	0	------	0	1	2	3	0	2	0	5	12
Terre Haute	0	------	2	0	4	4	0	0	0	0	36
Illinois.											
Alton	0	------	0	1	1	2	0	0	0	0	1
Chicago	14	15	4	6	80	287	1	38	2	168	786
Elgin	0	------	0	0	0	3	0	0	0	1	5
Moline	0	------	0	1	1	24	0	0	0	2	12
Springfield	0	1	0	1	4	17	0	0	0	2	28
Michigan:											
Detroit	7	10	4	26	37	120	0	19	0	157	281
Flint	1	------	0	0	5	11	0	0	0	23	37
Grand Rapids	0	------	1	6	3	12	0	0	0	2	40
Wisconsin:											
Kenosha	0	------	0	0	1	3	0	0	0	5	10
Milwaukee	0	1	1	5	7	105	0	7	0	48	106
Racine	0	------	0	0	1	30	0	0	0	1	12
Superior	0	------	0	0	1	10	0	0	0	0	9
Minnesota:											
Duluth	0	------	0	0	3	9	0	0	0	2	18
Minneapolis	1	------	1	97	19	80	0	1	0	5	128
St. Paul	0	1	1	30	15	47	0	5	0	2	80

City reports for week ended Feb. 22, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa:											
Cedar Rapids	0	-------	-------	0	-------	2	1	-------	0	1	-------
Davenport	0	-------	-------	1	-------	9	0	-------	0	0	-------
Des Moines	2	-------	-------	0	-------	2	0	-------	0	0	40
Sioux City	0	-------	-------	0	-------	3	12	-------	0	1	-------
Waterloo	1	-------	-------	6	-------	5	0	-------	0	0	-------
Missouri:											
Kansas City	3	-------	2	1	19	43	0	7	0	2	116
St. Joseph	1	-------	0	0	7	2	0	0	0	0	26
St. Louis	10	-------	2	1	21	61	0	13	0	2	209
North Dakota:											
Fargo	0	-------	0	0	0	8	0	0	0	0	6
Grand Forks	0	-------	-------	0	-------	0	9	-------	0	0	-------
Minot	0	-------	0	0	0	18	0	0	0	0	4
South Dakota:											
Aberdeen	0	-------	-------	0	-------	1	0	-------	0	0	-------
Sioux Falls	0	-------	0	0	0	11	1	0	0	0	6
Nebraska:											
Omaha	1	-------	0	1	10	76	5	3	0	0	73
Kansas:											
Lawrence	0	-------	0	0	3	0	0	0	0	0	7
Topeka	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Wichita	1	-------	1	0	12	20	0	0	0	0	39
Delaware:											
Wilmington	0	-------	0	2	4	1	0	0	0	10	34
Maryland:											
Baltimore	3	19	1	36	23	28	0	9	1	34	243
Cumberland	1	-------	2	0	0	2	0	0	0	0	10
Frederick	0	-------	0	0	0	0	0	1	0	0	9
District of Col.:											
Washington	21	4	2	8	29	20	0	23	0	12	214
Virginia:											
Lynchburg	0	-------	0	4	4	1	0	1	0	1	17
Norfolk	0	227	0	-------	16	4	0	2	0	1	49
Richmond	1	-------	10	0	17	9	0	1	0	0	82
Roanoke	1	-------	1	0	5	3	0	0	0	0	16
West Virginia:											
Charleston	2	1	0	0	5	1	0	1	0	0	19
Huntington	0	-------	-------	0	-------	1	0	-------	0	0	-------
Wheeling	0	-------	2	2	5	0	0	0	0	0	25
North Carolina:											
Gastonia	0	-------	0	0	1	0	0	0	0	0	4
Raleigh	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Wilmington	0	-------	0	0	3	0	0	1	0	0	12
Winston-Salem	0	3	1	98	8	2	0	2	0	0	14
South Carolina:											
Charleston	0	432	7	0	5	0	0	1	0	0	36
Columbia	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Greenville	0	-------	0	21	2	0	0	1	0	0	8
Georgia:											
Atlanta	5	396	7	1	23	8	0	8	0	0	135
Brunswick	1	-------	0	0	1	0	0	0	0	0	4
Savannah	0	207	8	0	7	1	0	2	1	0	41
Florida:											
Miami	0	-------	0	1	5	0	0	2	0	4	32
Tampa	0	1	1	0	3	4	0	0	0	0	27
Kentucky:											
Ashland	2	7	-------	0	-------	0	0	-------	0	0	-------
Covington	0	-------	0	1	3	0	0	1	0	2	34
Lexington	0	-------	0	0	6	0	0	2	0	0	25
Louisville	1	3	1	4	11	15	0	2	0	27	68
Tennessee:											
Knoxville	1	3	3	10	5	2	0	1	0	0	39
Memphis	5	-------	6	0	20	7	0	7	0	7	110
Nashville	0	-------	1	0	13	0	0	3	1	1	55
Alabama:											
Birmingham	0	91	3	0	21	6	0	6	0	0	86
Mobile	0	133	1	0	3	0	0	1	0	0	24
Montgomery	1	43	-------	1	-------	1	0	-------	0	1	-------
Arkansas:											
Fort Smith	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Little Rock	1	-------	1	0	10	3	0	4	0	0	16
Louisiana:											
Lake Charles	0	-------	0	0	1	0	0	0	0	0	9
New Orleans	8	13	10	24	28	0	0	6	0	18	199
Shreveport	2	-------	0	18	17	0	0	2	0	0	76
Oklahoma:											
Oklahoma City	0	29	0	0	7	3	0	3	0	0	57

City reports for week ended Feb. 29, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Texas:											
Dallas	4	1	1	57	16	7	0	8	0	2	71
Fort Worth	0	------	2	2	9	4	0	0	0	0	46
Galveston	2	------	0	5	5	2	0	2	0	0	24
Houston	4	------	2	26	16	3	0	3	1	0	81
San Antonio	1	------	15	0	13	4	0	11	0	0	[illegible]
Montana:											
Billings	0	------	0	0	2	20	0	0	0	1	10
Great Falls	0	------	0	0	0	7	0	0	0	5	11
Helena	0	------	0	0	1	0	0	0	0	0	11
Missoula	0	------	0	8	1	11	0	0	0	0	6
Idaho:											
Boise	0	------	0	3	1	12	0	1	0	6	4
Colorado:											
Colorado Springs	0	------	0	0	2	1	2	2	0	0	9
Denver	4	------	2	11	8	30	1	6	0	9	96
Pueblo	0	------	1	0	3	24	0	2	0	0	17
New Mexico:											
Albuquerque	1	------	0	1	5	23	0	1	0	4	13
Utah:											
Salt Lake City	0	------	1	1	2	78	0	1	0	6	40
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	3	53	14	28	2	8	0	1	115
Spokane	0	1	1	7	8	8	0	1	0	0	34
Tacoma	0	------	------	6	2	2	0	2	0	0	20
Oregon:											
Portland	0	------	1	318	11	18	0	1	1	1	91
Salem	0	2	------	7	------	3	0	------	0	0	------
California:											
Los Angeles	12	243	8	385	29	102	0	28	1	19	379
Sacramento	0	22	4	10	9	5	0	2	0	2	48
San Francisco	0	26	4	356	13	64	0	9	0	13	185

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:			
Boston	2	2	0
Worcester	1	0	0
Rhode Island:			
Providence	1	1	0
Connecticut:			
New Haven	1	0	0
New York:			
Buffalo	3	0	0
New York	16	10	0
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	1	1	0
Ohio:			
Cincinnati	2	0	0
Cleveland	2	1	0
Toledo	2	0	0
Indiana:			
Indianapolis	2	0	0
Illinois:			
Chicago	8	0	0
Springfield	3	1	0
Michigan:			
Detroit	1	0	0
Minnesota:			
Minneapolis	0	3	0
Iowa:			
Sioux City	2	0	0
Missouri:			
St. Joseph	1	0	0
Nebraska:			
Omaha	2	1	0
Maryland:			
Baltimore	8	3	0
District of Columbia:			
Washington	4	0	0
Virginia:			
Roanoke	1	0	0
West Virginia:			
Wheeling	1	0	0
South Carolina:			
Charleston	8	1	0
Greenville	0	1	0
Georgia:			
Atlanta	2	0	0
Florida:			
Tampa	1	0	0
Kentucky:			
Lexington	1	0	0
Tennessee:			
Memphis	0	1	0
Alabama:			
Birmingham	1	1	0
Louisiana:			
New Orleans	3	1	0
Shreveport	0	3	0
Oklahoma:			
Oklahoma City	1	2	0
Texas:			
Fort Worth	1	1	0
Houston	3	1	0
California:			
Los Angeles	2	1	0
Sacramento	1	0	0
San Francisco	1	0	0

Epidemic encephalitis.—Cases: Minneapolis, 1; St. Louis, 1; San Francisco, 1.

[illegible].—Cases: Chicago, 1; Memphis, 1; Nashville, 1; Dallas, 2; San Francisco, 1.

FOREIGN AND INSULAR

EGYPT

Infectious diseases—First quarter 1935.—During the first quarter of 1935, certain infectious diseases were reported in Egypt as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	3	--------	Plague	6	6
Cerebrospinal fever	128	99	Poliomyelitis	4	2
Chicken pox	458	2	Puerperal septicemia	190	111
Dengue	1	--------	Rabies	2	2
Diphtheria	393	169	Scarlet fever	21	--------
Dysentery	295	85	Smallpox	124	16
Epidemic jaundice	1	--------	Tetanus	90	61
Erysipelas	764	139	Tuberculosis (pulmonary)	1,028	652
Influenza	1,700	155	Typhoid fever	593	181
Leprosy	49	23	Typhus fever	1,458	219
Malaria	227	4	Undulant fever	1	--------
Measles	1,383	246	Whooping cough	396	35
Mumps	190	1			

Vital statistics—First quarter 1935.—Following are vital statistics for the first quarter of 1935 in all places of Egypt having a health bureau:

Population	4,603,100	Deaths per 1,000 population	24.2
Live births	52,378	Deaths from diarrhea and enteritis under 2 years	3,795
Births per 1,000 population	45.5	Infant mortality per 1,000 live births	132
Stillbirths	855		
Total deaths	27,895		

ITALY

Communicable diseases—4 weeks ended January 5, 1936.—During the 4 weeks ended January 5, 1936, certain communicable diseases were reported in Italy as follows:

Disease	Dec. 9-15		Dec 16-22		Dec. 23-29		Dec. 30, 1935–Jan. 5, 1936	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	16	16	16	14	17	16	15	15
Cerebrospinal meningitis	13	12	10	10	18	12	18	10
Chicken pox	330	110	371	119	236	94	320	120
Diphtheria and croup	721	360	548	280	537	275	521	301
Dysentery	11	5	9	8	3	3	5	5
Hookworm disease	1	1	8	4	4	4	1	1
Lethargic encephalitis	1	1	4	4	--------	--------	5	4
Measles	1,123	260	936	180	844	162	943	198
Paratyphoid fever	64	54	56	37	76	27	29	26
Poliomyelitis	18	11	13	12	13	12	16	15
Puerperal fever	51	46	39	39	32	32	46	40
Rabies	--------	--------	--------	--------	1	1	--------	--------
Scarlet fever	513	208	391	156	359	152	327	147
Smallpox	3	1	--------	--------	--------	--------	--------	--------
Typhoid fever	427	240	321	202	275	146	279	176
Undulant fever	24	18	8	8	25	17	19	16
Whooping cough	206	74	167	68	138	56	175	76

YUGOSLAVIA

Communicable diseases—January 1936.—During the month of January 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	32		Paratyphoid fever	12	1
Cerebrospinal meningitis	14	5	Scarlet fever	534	13
Diphtheria and croup	848	66	Sepsis	10	1
Dysentery	22	6	Tetanus	13	6
Erysipelas	345	16	Typhoid fever	674	68
Lethargic encephalitis	2		Typhus fever	131	8
Measles	611	11			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for February 28, 1936, pages 227-240. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued March 27, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

CHOLERA

India—Moulmein.—During the week ended February 22, 1936, one fatal case of cholera was reported at Moulmein, India.

Siam—Bisnulok.—During the week ended February 22, 1936, one case of cholera was reported at Bisnulok, Siam.

PLAGUE

Argentina—Bahia Blanca.—A report dated February 28, 1936, states that one death from bubonic plague and one suspected case of plague were reported near Bahia Blanca, Argentina.

Hawaii Territory—Hawaii Island—Hamakua District—Hamakua Mill Sector.—On February 19, 1936, one plague-infected rat was reported in Hamakua Mill Sector, Hamakua District, Hawaii Island, Hawaii Territory.

SMALLPOX

Ceylon—Colombo.—During the week ended January 18, 1936, one case of smallpox was reported at Colombo, Ceylon.

YELLOW FEVER

Brazil.—Yellow fever has been reported in Brazil as follows: February 9, 1936, one case with one death at Londrina, Parana State; during the period February 3-6, 1936, two cases with two deaths were reported at Araraquara, Sao Paulo State.

UNITED STATES TREASURY DEPARTMENT

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An Analysis of Deaths Recorded as Due to Heart Disease
Studies of Experimental Lymphocytic Choriomeningitis
Deaths in Large Cities During the Week Ended February 29
Current State and City Reports of Communicable Diseases
Quarantinable and Other Diseases in Foreign Countries

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UNITED STATES PUBLIC HEALTH SERVICE

W. F. DRAPER, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen R C WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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THE PICTURE OF HEART DISEASE MORTALITY OBTAINED FROM VITAL STATISTICS IN WASHINGTON, D. C., DURING 1932 [1]

By O. F. Hedley, *Passed Assistant Surgeon, United States Public Health Service*

According to vital statistics, heart disease is the leading cause of death. These statistics unfortunately are not based on the etiology of heart disease but largely on organic changes. As a result it is difficult to interpret heart disease mortality according to current clinical concepts. In this article an attempt is made to show the incidence of heart disease in various age groups and races, by sex, and to point out how the various etiological factors operate, even though not mentioned specifically in the official tabulation of heart disease mortality.

Heart disease mortality statistics are far from perfect. Many well-recognized forms of heart disease, such as congenital malformations and deaths from heart disease in rheumatic fever and acute rheumatic carditis, are not tabulated as heart disease. Deaths from syphilitic heart disease, thyrotoxic heart disease, the myxedema heart, and other less common forms of heart disease are recorded as due to their respective etiological factors when reported using etiological terminology. Furthermore, it is quite likely that about 25 percent of the reported deaths from heart disease are due to other conditions.[2]

Vital statistics represent the picture of mortality determined by the mass of practicing physicians filing death certificates and the method of tabulation by official agencies. To this extent they depict a cross-section of American medicine, both private and official.

A total of 7,949 death certificates filed with the registrar of vital statistics in Washington, D. C., during 1932 was examined.[3] Abstracts were made of 1,631 certificates, these having been classified by the registrar as heart disease (titles no. 90–95) according to the International List of Causes of Death.

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[1] From Office of Heart Disease Investigations

[2] Hedley, O. F.: Heart disease mortality. Pub. Health Bull. (In press.)

[3] The writer is indebted to Dr. W. C. Fowler, health officer, and to Mr John H. Milligan, registrar of vital statistics, of the District of Columbia, for permission to examine and abstract these death certificates. Much information used in this survey was obtained from the Annual Report of the Health Officer to the Commissioners of the District of Columbia for the year ending June 30, 1933. The report of the health officer covered the calendar year of 1932.

MORTALITY FROM RECORDED HEART DISEASE AMONG THE GENERAL POPULATION

There were 1,129 deaths recorded as being due to heart disease among the white and 502 among the colored population. The estimated population of the District of Columbia in 1932 was 493,000, of which 357,000 were white and 136,000 were colored. The mortality rate from all causes was 1,616 per 100,000. The death rate among the white population was 1,406, while that among the colored was 2,155 per 100,000 population. The death rate from recorded heart disease was 330 per 100,000. The reported death rate from heart disease among the white population was 316 per 100,000, while that among the colored was 362. The reported death rate due to heart disease is considerably higher than that for the United States registration area and even higher than the reported death rate from heart disease in most cities and states,[4] due most probably to the large Negro population, many adult Government workers, the presence of elderly parents of Government employees who come to Washington to live with their children, the transient nature of certain elements of the population, the large number of retired Government personnel who continue to reside in the District, and the numerous Federal hospitals and institutions.

MORTALITY RATES FROM RECORDED HEART DISEASE IN SPECIFIC AGE GROUPS

In table 1 a study is made of deaths per 100,000 in various age groups. Despite the fact that only a small proportion of deaths from heart disease occurs in persons under 25 years of age, it is still a problem of considerable public health significance. There is a tendency to minimize the importance of heart disease during this period, because, in contrast with other age groups, relatively few deaths occur. This is a mistake. It should be compared with other disease entities, especially those occurring within this age group. There were 52 deaths reported as due to heart disease in this period; nearly as many deaths as due to typhoid fever, paratyphoid fever, typhus, measles, scarlet fever, whooping cough, and diphtheria combined and at all ages. When it is considered that most deaths from congenital heart disease and only slightly over 50 percent of the mortality from rheumatic heart disease are tabulated as heart disease, the importance of heart disease as a cause of death under 25 years of age becomes even more significant.[5]

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[4] Whitney, Jessamine S.: Heart disease mortality statistics. (U. S. registration area.) Am. Heart Assoc., 1934.

[5] Hedley, O. F.: A critical analysis of heart disease mortality. Jour. Am. Med. Assoc., 105: 1405 (1935).

Tamm 1.—*Population distribution, number of deaths, and specific death rates per 100,000 from deaths recorded as being due to heart disease, by color and sex, in each age group of the population in Washington, D. C., during 193[illegible]—population distribution based on 1930 census*

Age group	Male			Female			Total		
	Population	Deaths from heart disease	Rate per 100,000	Population	Deaths from heart disease	Rate per 100,000	Population	Deaths from heart disease	Rate per 100,000
0-14	35,428	8	22	34,848	10	29	70,276	18	25
15-24	28,619	10	35	30,533	5	16	59,152	15	25
25-34	31,929	19	59	33,937	17	50	65,866	36	55
35-44	27,748	43	155	30,448	20	65	58,196	63	108
45-54	21,250	84	395	24,192	29	120	45,442	113	248
55-64	14,559	154	1,058	17,222	85	493	31,781	239	752
65-74	7,134	180	2,523	9,207	134	1,456	16,341	314	1,922
75 and over	2,536	140	5,520	4,085	190	4,650	6,621	330	4,984
0-14	14,748	4	27	15,546	2	13	30,294	6	20
15-24	11,229	5	45	13,852	8	57	25,081	13	52
25-34	12,883	16	125	14,466	21	144	27,349	37	135
35-44	10,290	42	408	11,427	41	359	21,717	83	382
45-54	7,680	56	728	8,184	68	835	15,824	124	784
55-64	3,240	50	1,548	3,546	60	1,690	6,786	110	1,621
65-74	1,357	40	2,948	1,708	45	2,635	3,045	85	2,791
75 and over	444	12	2,700	782	30	3,836	1,226	42	3,426

TOTAL, MALE AND FEMALE, WHITE AND COLORED

Age group	Population	Deaths from heart disease	Rate per 100,000	Age group	Population	Deaths from heart disease	Rate per 100,000
0-14	100,640	24	24	45-54	61,306	237	386
15-24	84,193	28	33	55-64	38,567	349	905
25-34	93,215	73	78	65-74	19,466	399	2,060
35-44	79,913	146	183	75 and over	7,847	372	4,731

In the group 35–44 years of age the importance of heart disease becomes felt to a greater extent. It is responsible for deaths at the rate of 155 per 100,000 among white males as compared with 65 per 100,000 among white females. In the colored population it results in 408 deaths per 100,000 among males and 359 deaths per 100,000 among females. The death rate in this period is nearly four times as great among the colored as among the white population and nearly six times greater among colored females than among white females.

In the group 45–54 years of age the death rate is 395 per 100,000 among white males as compared with 120 per 100,000 among white females, or over three times as high. Among the colored males the death rate is 728 per 100,000, while among colored females it is 835. The death rate during this period is three times higher among the

colored than among the white population and nearly seven times higher among colored than among white females.

In the group 55–64 years of age the incidence continues to mount. That among white males is 1,058 per 100,000, while that among white females is 493 per 100,000. Among colored males the rate is 1,546 per 100,000 as compared with 1,690 per 100,000 among colored females. The rate for the colored population is twice that for the white and that among colored females over three times that among white females.

In the 65–74 age period the mortality rate from deaths recorded as heart disease is 2,523 per 100,000 among white males as compared with 1,456 among white females. Among colored males it is 2,948 per 100,000, while among colored females it is 2,635. The death rate in this age group among the colored population is still well above that among the white population. The differences between the sexes of the two races is less marked, although the rate among colored females is still nearly twice that among white females.

Among those surviving 75 years of age, the rate among white males is 5,520 per 100,000, while that among white females is somewhat less, 4,650. Among the colored population the rates are 2,700 and 3,836 among male and female sexes, respectively.

Heart disease increases in importance as a cause of death among each race and sex with each successive decade. This becomes more manifest in adult life, especially after 35 years of age. Between 35 and 64 years of age the incidence of deaths recorded as being due to heart disease is three times greater among white males than among white females. In the colored population the rate is slightly higher among females. This difference is noteworthy. To a certain extent it is probably more apparent than real, owing to cardiovascular syphilis, which results in many cardiac deaths among colored males, only part of which are recorded as heart disease. The greater frequency of hypertensive heart disease among colored females counterbalances this to a certain extent, however. The greater incidence of fatal heart disease among colored than among white women is explained in a large measure by the more sheltered lives of the latter and the greater prevalence of hypertension and syphilis among the former. Syphilitic heart disease is not, however, as prevalent among colored females as might be expected on the basis of studies of cardiovascular syphilis conducted on colored males.[6]

[6] Hedley, O. F.: A study of 450 fatal cases of heart disease occurring in Washington, D. C., hospitals during 1932, with special reference to etiology, race, and sex. Pub. Health Rep., 50: 1127–1153 (Aug. 23, 1935).

AVERAGE AGES AT DEATH

The average ages at death were as follows:

	Number	Age (years)
Total whites	1,129	64.9
Male	638	62.7
Female	491	67.7
Total colored	502	53.5
Male	227	52.4
Female	275	53.3
Total both races	1,631	61.4

In evaluating the significance of heart disease as a public health problem on the basis of the officially recorded statistics, it should be taken into consideration that the average age at death among the white population occurs in the age period 60–69 years, and that among the colored in the 50–59-year age group. Among white females the average age at death is nearly 70 years. DePorte,[7] in New York State, noted that the average age at death was slightly higher. He found that it was 67.6 years—66.7 years and 68.7 years for males and females, respectively. Practically all of his deaths were among white persons. In each racial and sex group the average age at death exceeds the life expectancy for that particuar group and the average age among white deaths recorded as being due to heart disease exceeds that of the general population. There is a distinct difference in ages at death between the two races and a less marked difference between the sexes.

AGE DISTRIBUTION

Not only does the average age but also the distribution of the ages at death vary with race and sex. The maximum number of white male deaths recorded as being due to heart disease occurs in the age period 60–69 years, as shown in figure 1. That among the white females occurs in the age period 70–79 years. The greatest incidence in the colored race occurs somewhat earlier, among the males between 40 and 49 years and among the females between 50 and 59 years. The reason that the peak number of reported cardiac deaths occurs in earlier decades among the colored population is due to the greater prevalence of cardiovascular syphilis and the greater havoc wrought by the degenerative, particularly hypertensive, heart diseases among Negroes.

[7] DePorte, J. V. Heart disease in general medical practice. Amer. Heart Jour., 8 476, 1933.

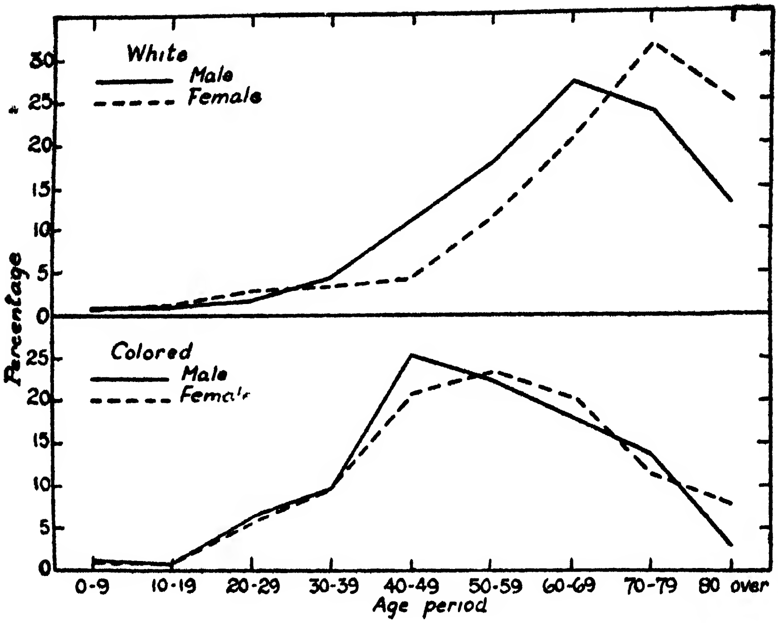

FIGURE 1.—Comparative percentage distribution between white and colored races of 1,631 deaths recorded as due to heart disease in Washington, D C, 1932

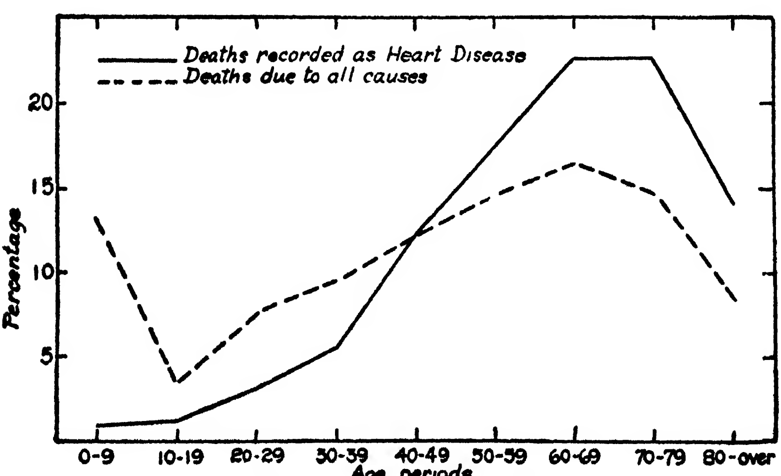

FIGURE 2.—Percentage of deaths in each age group among 1,631 deaths recorded as being due to heart disease as compared with 7,949 deaths due to all causes in Washington, D C, 1932

COMPARISON OF THE RECORDED MORTALITY FROM HEART DISEASE WITH THE GENERAL MORTALITY

A comparison between the age distribution of deaths recorded as being due to heart disease and that of deaths due to all causes, as shown in figure 2, indicates that heart disease plays a relatively unimportant role as a cause of death during the first decade. During the next 3 decades it is responsible for an increasingly higher proportion of deaths, but lags behind the general mortality. Deaths from heart disease are far more heavily distributed among the age brackets above 40 years than are deaths from all causes. The diver-

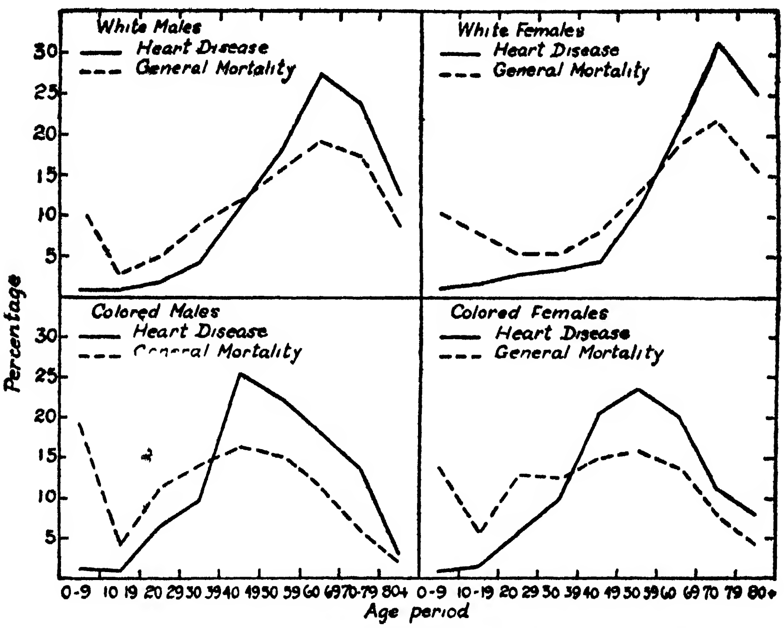

FIGURE 3.—Percentage of deaths in specific age groups among 1,631 deaths recorded as being due to heart disease as compared with 7,949 deaths due to all causes, by color and sex, in Washington, D. C., 1932.

gence of the two curves before and after the age group 40–49 years would probably be much less marked if it were not for the fact that the present system of recording tends to eliminate from the heart-disease curve many deaths of congenital, syphilitic, thyrotoxic, and rheumatic etiology.

Additional information is elicited by comparing the distribution of deaths from heart disease in each race and sex with the general mortality. (See figure 3.) In the age period between 10 and 29 years heart disease results in a relatively higher proportion of deaths among the white population than among the colored, due to the lower incidence of deaths due to infectious diseases, especially tuberculosis.

The peak incidence of deaths due to heart disease and that of deaths in general occurs in identical decades in each race and sex group, and the distribution of deaths in ages beyond these points tends to run parallel. There is a sharp increase in the percentage of deaths recorded as being due to heart disease among white males beginning with the age period 40–49 years, while that among white females does not increase until a decade later. In both of the colored groups there is a considerable increase in mortality from heart disease in the 30–39-year age period, with an almost precipitous increment in the 40–49-year bracket. There are two factors to account for this; namely, the increase in deaths due to hypertensive heart disease and to cardiovascular syphilis, the latter being not infrequently reported as valvular lesions or as myocarditis, and as such finding expression in the mortality statistics as being due to heart disease.

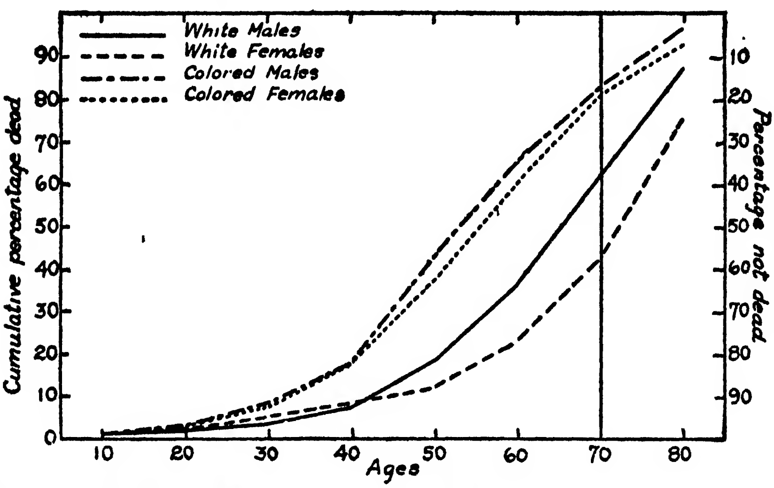

FIGURE 4.—Cumulative percentage, by color and sex, of 1,631 deaths recorded as being due to heart disease either prior to or after various ages, with special reference to those surviving 70 years of age, in Washington, D. C., 1932.

A comparatively small proportion of the Negro population survives 60 years of age. This is clearly seen by studying both the curves of deaths due to all causes and those recorded as being due to heart disease. Britten [8] has shown that the mortality rate from all causes and the rate for a number of conditions, including heart disease, are higher among wage earners in the United States than in England. Since American Negroes are for the most part in the occupational class of unskilled laborers (including domestics), this may account for the increased and earlier mortality from heart disease among this group. Certainly it cannot be said categorically that there is any

[8] Britten, Rollo H.: Mortality rates by occupational class in the United States. Pub. Health Rep., 40: 1101–1111 (Sept. 21, 1925).

racial predisposition among the Negroes to cardiovascular deterioration.

TOTAL RECORDED MORTALITY FROM HEART DISEASE OCCURRING PRIOR TO VARIOUS AGES

In figure 4 are shown by means of a cumulative curve the total percentages of deaths reported as being due to heart disease both prior to and after various ages. Less than 10 percent of the deaths recorded as being due to heart disease occur before the age of 30 years. Racial differences become more pronounced after that period. By 40 years of age nearly 20 percent of the total deaths recorded as due to heart disease will have occurred in Negroes, while among the white population less than 10 percent will have occurred. Colored males die the earliest, while colored females follow with only a slightly delayed rate. Deaths from recorded heart disease occur considerably earlier among the colored than among the white and among white males as compared with white females.

Of the total recorded cardiac deaths, 37.2 percent occur at the age of 70 years or older. Among white males 36.3 percent die during this well-advanced period, while among white females 56.1 of those listed as having died of heart disease survive 70 years of age. The Negroes are not so fortunate. Only 16.4 percent of the total deaths recorded as being due to heart disease among Negro males occur in the seventies or older, while only 18.9 percent of colored females to whom heart disease is attributed as the cause of death survive three score and ten years.

That such a large proportion of these deaths occurs during these advanced ages cannot be attributed to any peculiarity of the population distribution of the District of Columbia. In Chicago, Ill., in 1930, 30.8 percent of the deaths recorded as due to heart disease occurred at 70 years or older,[9] while in Virginia, during 1932, 41.6 percent occurred during this period.[10]

It is quite significant that approximately a third of the deaths reported as heart disease occur in individuals of 70 years or older. The question arises to what extent these deaths are really due to cardiac affections. Frequently heart disease is only part of a general clinical picture due to conditions either produced by or associated with degenerative changes. Generalized arteriosclerosis and arteriolosclerosis, diabetes, prostatic hypertrophy, senile encephalopathies, and other afflictions attending advancing years not infrequently occur concomitantly with heart disease and with each other. In a way these deaths are due to heart disease by default, in that infections,

[9] Report of Board of Health, Chicago, Ill. 1930.

[10] Report of the Bureau of Vital Statistics for the year ended Dec. 31, 1932. Virginia Health Bulletin, vol. 26, no. 4, April 1934.

trauma, and neoplasms have not resulted in death at an earlier period. One cannot escape the impression after extensive perusal of death records that many old people are recorded as having died of heart disease principally, if not solely, on the grounds that they died when their hearts stopped beating.

It is doubtful, however, that any system of reporting and recording deaths could be devised which would eliminate this effect. Certainly there is nothing to be gained by reporting these deaths as due to senility. The trouble lies not in considering such deaths as due to heart disease but in assuming that, because there has been an increase in heart disease among the older age periods, this holds for all types of heart disease. If there were less emphasis on heart disease in general and more importance attached to the various etiological components, much of the present-day hysteria on the subject would be greatly reduced, and it might be possible to formulate plans for attacking certain aspects of this problem.

An understanding of the biological principles attending old age is necessary for a proper interpretation of heart disease occurring during this period. Death due to circulatory failure in such cases is but the clinical reflection of wide-spread senile changes. As there is little likelihood of adding to the span of human life, while on the other hand life expectancy at birth has greatly increased, a crowding of the population into the older age brackets has resulted. Cohn[11] has invited attention to the fact that the increase in heart-disease mortality did not occur simultaneously with the beginning of the decline in deaths from infectious diseases, but about 17 years later. Those who would have died of infectious diseases lived until the effects of senescence became manifest. It is felt that this will continue, and with it there will be a greater incidence of heart disease of a sort. It is the result of benign rather than malevolent influences and should be considered in the light of a victory for medical science.

Percentage of total mortality recorded as heart disease

Group	Total deaths	Deaths recorded as due to heart disease	Percent of deaths recorded as due to heart disease
Total whites	5,018	1,120	22.4
Male	2,770	629	22.7
Female	2,248	491	21.8
Total colored	2,931	502	17.1
Male	1,528	227	14.2
Female	1,403	275	19.6
Total both races	7,949	1,621	20.5

[11] Cohn, Alfred E.: Heart disease from the point of view of the public health. Am. Heart Jour., 2: 275, 386 (1927).

The lower percentage of deaths due to heart disease among the colored population is likely to be misleading. The reason that a relatively smaller proportion of the total mortality is due to cardiac affections is that there is a greater number of deaths from infections, particularly tuberculosis, among Negroes during the earlier decades. As a result, relatively fewer survive to die subsequently of heart disease. With the prevention of those factors causing deaths at earlier ages it is expected that a higher proportion of deaths among colored people will result from diseases of the heart. It has been remarked rather cynically that medical science saves people from dying of tuberculosis to have them succumb later to cancer. This appears even more poignantly true of heart disease.

Another factor resulting in a lower percentage of the total deaths being listed as heart disease (titles nos. 90–95 of the International List of Causes of Death) among colored than among white deaths is that syphilitic heart disease when reported as such is not recorded as a cardiopathy but as title no. 34, syphilis, or as title no. 96, aneurysms. Furthermore, it appears that in certifying deaths due to cardiovascular syphilis more attention may be given to the venereal disease aspects when occurring in Negroes than when occurring in white persons.

The extent to which heart disease participates in the total mortality in each decade is shown in figure 5. In general, heart disease accounts for a greater percentage of the total mortality in each succeeding decade until over 35 percent of deaths from all causes are recorded as being due to that cause. It is a mistake, however, to assume that heart disease is a relatively unimportant mortality factor in youth and early adult life In spite of the limitations imposed by the International List of Causes of Death, heart disease is accredited with 8 percent of the total deaths during the period between 10 and 29 years.

The relative incidence by sex and color is given in figure 5. Among white females there is a rather considerably higher proportion of deaths recorded as being due to heart disease between 10 and 39 years of age than among white males during these periods. This is probably due to the higher incidence of rheumatic heart disease among white females, and possibly to childbearing. During the succeeding periods between 40 and 69 years the extent to which heart disease results in the general mortality among white males becomes more manifest. In the very advanced periods the percentage of deaths listed as heart disease tends to become approximately similar in the two sexes. Heart disease among colored females exceeds that among males as a recorded cause of death in nearly every age period, especially in the brackets between 40 and 69 years of age. As compared with the white population, heart disease results in about twice the

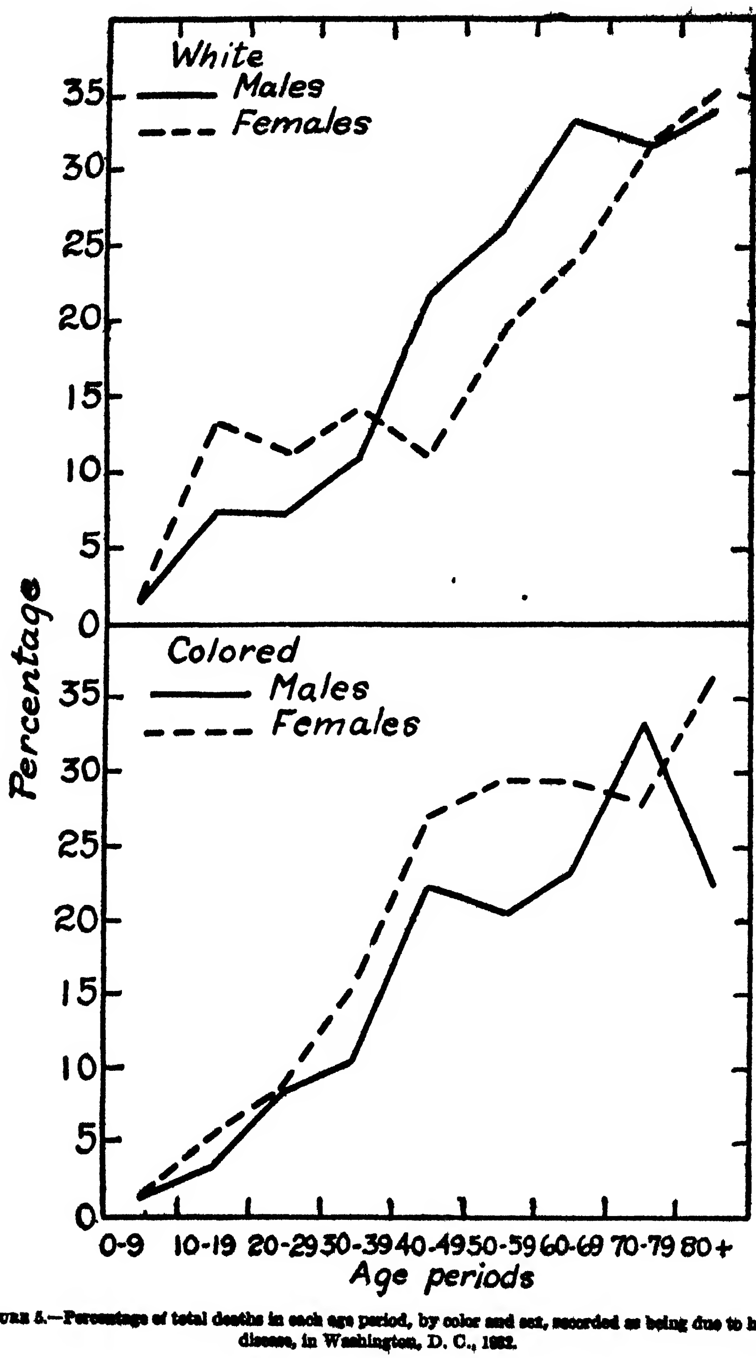

FIGURE 5.—Percentage of total deaths in each age period, by color and sex, recorded as being due to heart disease, in Washington, D. C., 1932.

percentage of total deaths in the colored population between 40 and 49 years of age as among the white population during that period. This has been noted by Dublin,[12] using the experiences of the industrial department of the Metropolitan Life Insurance Co. Dublin also noted that, in contrast with white females, the rate among colored females was as high as, if not higher than, that of colored males.

SEASONAL VARIATIONS IN MORTALITY

The incidence of deaths recorded as being due to heart disease is increased during the colder months and reduced during the warmer months, as shown in figure 6. There is a striking rise in the incidence of deaths from heart disease with the onset of cold weather, with an even greater secondary rise toward the end of winter and in the

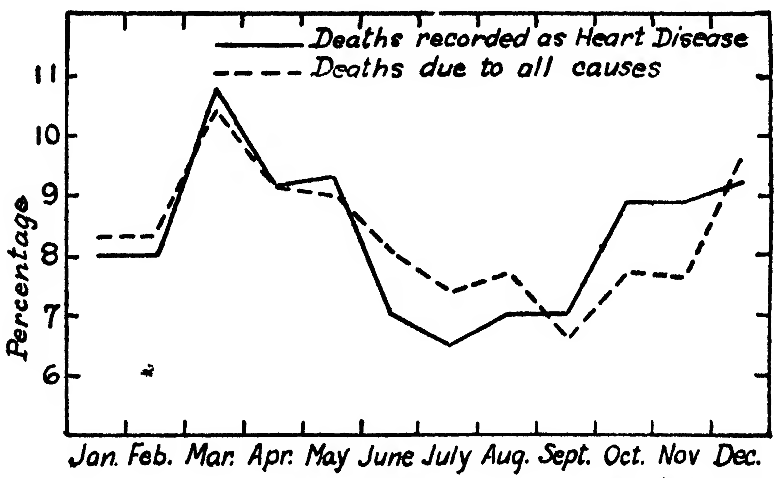

FIGURE 6.—Distribution, by months, of 1,631 deaths recorded as being due to heart disease and occurring in Washington, D. C., during 1932, as compared with 7,949 deaths due to all causes.

spring months. This approximates the seasonal distribution of the general mortality. Cardiac patients withstand the effects of respiratory infections very poorly. Conditions resulting only in temporary discomfort to individuals without circulatory impairments are frequently fatal to those suffering from heart disease, especially those in incipient stages of congestive heart failure.

SUMMARY AND CONCLUSIONS

An analysis has been made of deaths recorded as being due to heart disease in Washington, D. C., during 1932. The limitations of such a study are obvious, being due to vagaries in the reporting of deaths and to difficulties inherent in the present system of collecting and

[12] Dublin, L. I.: Statistical aspects of problems of organic heart disease. Amer. Heart Jour., 1: 389 (1926).

tabulating mortality statistics. The study is based, however, on the official records of what constitutes heart-disease mortality and as such should be given consideration.

Heart disease becomes of greater significance as a cause of death with each succeeding decade. It is of greater significance among white males than among white females and in the colored than in the white race. These differences are more pronounced in the periods between 35 and 64 years of age. The most marked differences in mortality in specific age groups occur in colored females as compared with white females. It is believed that the comparisons of the mortality incidence are reasonably accurate in that the same sources of error operate in each race and sex.

Over a third of the deaths recorded as heart disease occur at the age of 70 years or older. Among white females over 50 percent occur at 70 or older, while among white males about a third of the total recorded deaths from heart disease are in this period. Less than a fifth of the colored persons recorded as dying of heart disease survive three score and ten years.

Deaths in advanced years should not be considered in the same light with those due to infections or metabolic forms of heart disease, or even with certain of the arteriosclerotic and hypertensive forms occurring earlier, such as coronary arteriosclerosis and essential hypertension in middle age.

While only a small proportion of the aggregate number of deaths from heart disease occurs under 25 years of age, it is nevertheless a public health problem of considerable importance when compared with deaths from other causes, especially those occurring within this age period. It should be borne in mind that most of the deaths from heart disease under 25 years of age are due to the cardiac manifestations of rheumatic fever, only a part of which are tabulated as heart disease, the remainder being recorded as due to rheumatic fever.

DISTRIBUTION OF LYMPHOCYTIC CHORIOMENINGITIS VIRUS IN THE ORGANS OF EXPERIMENTALLY INOCULATED MONKEYS

By Charles Armstrong, *Surgeon*, J. G. Wooley, *Acting Assistant Surgeon*, and Robert H. Onstott, *Passed Assistant Surgeon*, *United States Public Health Service*

The presence of choriomeningitis virus in the brain, blood, spinal fluid, and urine of experimentally infected monkeys has been reported (1). The work here recorded constitutes an effort to determine further the distribution of the virus in the organs of infected animals (*Macacus rhesus*).

EXPERIMENT I

Monkey no. 754 was inoculated intravenously on December 19, 1934, with 6 cc of supernatant fluid from a 1:20 suspension of mouse brain virus in saline, which had been allowed to settle for 15 minutes.

The animal developed fever on December 24 and ran a typical course of severe choriomeningitis, death occurring on January 1, 1935. The autopsy revealed slight engorgement of the surface vessels of the brain. The superficial lymph nodes were enlarged and congested, and the abdominal and pleural cavities contained a small amount of clear, yellowish fluid. The lungs were mottled and covered by a slight amount of fibrinous exudate, the heart was flabby, the liver was pale yellow in color, and the spleen was soft, red, and slightly enlarged. The adrenals were large and the kidneys pale. Other organs appeared normal.

Portions of various organs (table 1) removed with sterile precautions were stored in 50 percent glycerol at +4° to +6° C. Samples of blood and pericardial fluid were similarly stored, but without glycerol. On the following day, January 2, 1935, samples of each organ were drained of excess glycerol, weighed, ground in a mortar (without sand), and 1:20, 1:100, 1:500, and 1:2500 suspensions made in saline. Each suspension was allowed to settle for a few minutes, and 0.03 cc of the supernatant fluid, after being pipetted off, was immediately inoculated intracerebrally into each of four mice. The mice were observed for 15 days and deaths recorded.

The symptoms in mice are quite characteristic, but may be of short duration and are easily missed. Mice dying from an intracerebral inoculation of the virus, however, quite regularly die in tetanic convulsions with the hind legs fully extended. This position maintained after death offers considerable aid in arriving at a diagnosis where symptons have been missed. As a further check on the diagnosis, brains from random samples of dead mice were submitted to Surgeon R. D. Lillie for pathological confirmation. The results checked closely with conclusions drawn from symptoms and position at death and indicated that deaths occurring from the fifth to twelfth days, inclusive, following inoculation, were so regularly due to the virus that, for practical purposes, the few exceptions may be ignored. However, the few deaths occurring before and after this interval were found usually to be due to other causes.

By reference to table 1, it may be noted that virus was present in all the organs and fluids tested, in many instances in sufficient amounts to bring about the death of all 4 mice in the highest dilution employed.

Since the dosage employed was uniformly 0.03 cc, it is possible to make a rough estimate of the number of minimal fatal intracerebral

mouse doses of virus in a gram of each organ or fluid tested. The results are shown in table 1.

TABLE 1.—*Determination of virus content in organs of monkey no. 754*

Tissues examined	Day of death for mice inoculated with—				Culture results 1:20 suspension	Estimated number of minimal fatal doses of virus for mice in 1 gram of tissue (0.03 cc intracerebrally)
	1:20 suspension	1:100 suspension	1:500 suspension	1:2500 suspension		
Abdominal fluid	2, 4, 7, 9	6, 7, 7, 7	6, 7, 10, [1] S	2, 7, 8, 8	Sterile	12,000
Adrenal	2, 7, 8, 8	5, 6, 8, 10	7, 7, 7, 7	2, 4, 6, 7	Growth, base slant	82,000+
Axillary gland	7, 7, 7, 7	7, 7, 7, 7	8, 8, 8, 9	6, 7, 7, 8	Few colonies	82,000+
Blood, heart, defibrinated.	2, 4, 8, S	4, 7, 7, 12	2, 2, 7, 8	8, 8, 8, 8	Sterile	82,000+
Cerebrum	7, 8, 10, S	1, 7, 7, 7	7, 10, S, S	8, 10, S, S	do	41,000
Kidney	7, 7, 7, S	7, 7, 8, 8	2, 8, 8, 8	8, 8, 12, S	do	62,000
Liver	4, 7, 8, 8	7, 7, 7, 9	6, 7, 7, 10	7, 12, S, S	do	41,000
Lungs	7, 7, 7, 8	1, 7, 7, S	6, 7, 8, 8	7, 8, 8, 8	Growth, base slant	82,000+
Marrow, red, femur	1, 1, 7, 7	5, 7, 8, S	6, 7, 7, 8	7, 7, 8, 12	Sterile	82,000+
Muscle, voluntary	2, 8, 9, 10	7, 7, 8, 8	1, 2, 8, 8	5, 8, 9, 10	do	82,000+
Pancreas	4, 7, 7, 7	6, 9, 11, 14	7, 7, 7, 7	7, 8, 11, S	Growth, base slant	62,000
Pericardial fluid	7, 10, 13, S	4, 7, 7, 7	7, 7, 7, 7	2, 7, 7, 14	Sterile	82,000+
Spleen	4, 7, 7, 13	1, 7, 9, S	5, 8, 8, 11	6, 8, 8, S	do	62,000
Salivary gland	6, 7, 7, 7	6, 7, 7, 8	5, 7, 7, 8	7, 9, 9, 10	do	82,000+

[1] S=Survived.

EXPERIMENT II

Since the route of inoculation conceivably might influence the distribution of the virus, it was deemed desirable to test the virus distribution in animals inoculated by other than the intravenous route. Consequently, the organs of monkey no. 30, which died 13 days following a combined intracerebral and intraperitoneal inoculation given for another purpose, were tested for virus.

At autopsy, the brain was congested, the superficial glands were reddened and enlarged, the right lung showed a small area of consolidation in the lower lobe, and there was free fluid in the right pleural cavity. The left lung and other organs appeared normal.

Tissues taken with sterile precautions were handled as in experiment I, except that less concentrated suspensions were employed; namely, 1:1000, 1:5000, 1:25000, and 1:125000. The tissues examined and the results, which indicate a wide distribution of the virus, are shown in table 2.

TABLE 2.—*Determination of virus content in organs of monkey no. 30*

Tissues examined	Day of death for mice inoculated with—				Culture results 1:1000 suspension	Estimated number of minimal fatal doses of virus for mice in 1 gram of tissue (0.03 cc intracerebrally)
	1:1000 suspension	1: 5000 suspension	1: 25000 suspension	1: 125000 suspension		
Adrenal	8, 10,[1] S, S	3, 5, 8, 8	8, 8, S, S	8, 8, S, S	Sterile	412, 000
Axillary gland	5, 7, 7, 7	9, 9, 10, S	S, S, S, S	S, S, S, S	do	124, 000
Bile	S, S, S, S	S, S, S, S	S, S, S, S	S, S, S, S	do	([2])
Blood, defibrinated	4, 7, 8, S	8, 8, S, S	11, S, S, S	S, S, S, S	do	22, 000
Cerebrum	7, 8, S, S	4, 9, 10, S	S, S, S, S	9, 4, S, S	do	110, 000
Kidney	3, 3, 8, 9	1, 11, S, S	S, S, S, S	S, S, S, S	do	33, 000
Liver	8, 9, 9, 10	8, 8, 9, S	7, S, S, S	11, S, S, S	do	124, 000
Lungs	8, 8, 8, 9	9, 9, 9, S	S, S, S, S	S, S, S, S	2 colonies, slant	124, 000
Marrow	8, 8, 9, 13	6, 7, S, S	8, 10, 13, S	S, S, S, S	Sterile	82, 000
Muscle, heart	8, 8, 9, 10	8, 11, S, S	2, S, S, S	S, S, S, S	3 colonies	82, 000
Muscle, voluntary	8, 9, 9, 10	2, S, S, S	S, S, S, S	S, S, S, S	Sterile	33, 000
Pancreas	7, 8, 8, 9	8, 8, 8, 10	8, 11, S, S	10, S, S, S	do	412, 000
Pleural fluid	3, 3, 3, 3	3, 3, 3, 3	2, 3, 4, 4	3, 5, 11, S	Many colonies	([2])
Salivary gland	9, 9, 10, S	4, S, S, S	S, S, S, S	S, S, S, S	Sterile	20, 000
Spinal cord	8, 9, S, S	S, S, S, S	9, S, S, S	3, S, S, S	Growth, base slant	16, 000
Testicle	9, 9, 9, 9	14, S, S, S	S, S, S, S	12, S, S, S	Sterile	33, 000

[1] S=Survived.

[2] None apparent.

EXPERIMENT III

Since monkeys no. 754 and no. 30 both had died of choriomeningitis, it was deemed desirable to test the organs of an animal sacrificed during the acute attack. Therefore, monkey no. 41 was inoculated subcutaneously with 6 cc of a 10 percent suspension of mouse brain virus on October 9, 1935. The animal developed symptoms of choriomeningitis and was etherized on October 18, 9 days after inoculation and on the fifth day of fever.

While the amount of virus in many organs of monkeys no. 754 and no. 30 appeared to be greater than could be accounted for by the presence of virus-containing blood in the vessels (tables 1 and 2), nevertheless it seemed desirable to remove the blood from monkey no. 41 insofar as was possible. The animal was etherized and bled from the heart, after which a cannula was inserted into the femoral vein of the left leg. The femoral artery of the right leg then was severed, and transfusion with saline was given until the heart ceased to beat and thereafter by manual manipulation of the chest until the effluent was clear.

At autopsy the organs appeared essentially normal, except for marked pallor.

Dilutions of spinal fluid and defibrinated blood were inoculated at once intracerebrally into white mice. Other tissues were stored in glycerol until the following day, when organ suspensions in saline were made and inoculated as in experiments I and II. Saline suspensions were employed in dilutions of 1:100, 1:1000, 1:2000, 1:4000, 1:8000, and 1:16000. The inoculation results, as recorded in table 3, indicate further that the virus is distributed widely throughout the organs of the infected animal, even after the tissues have been freed largely of blood by washing out with saline.

Table 3.—*Determination of virus content in organs of monkey No. 41*

Tissues examined	Day of death for mice inoculated with—								Culture results 1:100 suspension	Estimated number of minimal fatal doses of virus for mice in 1 gram of tissue (0.03 cc intracerebrally)
	Not diluted	1:10 suspension	1:100 suspension	1:1000 suspension	1:2000 suspension	1:4000 suspension	1:8000 suspension	1:16000 suspension		
Adrenals			6, 6, 7, 7	4, 7, 8, 8	5, 8, [1]S, S	4, 8, 8, S	3, 8, S, S	8, 9, 10, S	Growth, base tube	132,000
Axillary gland			7, 7, 8, 8	7, 8, 8, 13	7, 7, 10	7, 7, 8, 8	8, 9, S, S	6, 8, 9, 13	Sterile	132,000
Bile			S, S, S, S	S, S, S, S	S, S, S, S	S, S, S, S	S, S, S, S	S, S, S, S	do	([2])
Blood, defibrinated		7, 7, 7, 8			S, S, S, S	S, S, S, S	11, 14, 14	4, 14, S, S	do	330+
Cerebrum			1, 4, 10, S	S, S, S, S	9, S, S, S	1, 1, S, S	S, S, S, S	S, S, S, S	do	1,600
Kidney			7, 8, 8, 8	8, 8, 10, 10	8, S, S, S	8, 9, 9, S	2, S, S, S	11, S, S, S	Growth, base slant	33,000
Liver			6, 6, 7, 11	6, 6, 7, 7	8, 9, 9, S	7, 7, 8, 8	9, 9, 9, S	6, 7, 8, 10	Sterile	528,000+
Lungs			6, 7, S, S	8, S, S, S	3, 9, 10, 11	9, 11, S, S	2, 9, 11, S	10, S, S, S	Growth, base slant	1,600
Marrow, femur			7, 7, 8, 10	2, 8, S, S	1, 1, 13, S	8, 9, 13, 14	10, 10, S, S	7, S, S, S	6 colonies on slant	11,000
Muscle, heart			8, 9, 10, S	9, S, S, S	7, 7, S, S	1, 10, S, S	S, S, S, S	1, S, S, S	1 colony	2,500
Muscle, voluntary			6, 10, S, S	S, S, S, S	S, S, S, S	S, S, S, S	S, S, S, S	2, 4, S, S	4 colonies	1,600
Pancreas			6, 8, S, S	10, S, S, S	2, S, S, S	10, S, S, S	4, S, S, S	11, 14, S, S	Sterile	1,600
Salivary gland			7, 14, S, S	S, S, S, S	S, S, S, S	S, S, S, S	S, S, S, S	S, S, S, S	1 colony	1,600
Spinal cord			10, 10, 10, S	1, 1, 9, 13	1, 10, 13, S	13, S, S, S	9, S, S, S	S, S, S, S	Sterile	2,500
Spinal fluid	5, 7, 8, 10				S, S, S, S	S, S, S, S	S, S, S, S	S, S, S, S	do	33+
Spleen			7, 7, 7, 8	7, 7, 7, 8	1, 8, 8, 13	7, 7, 8, 9	7, 10, 11, S	1, 7, 8, 8	do	528,000+
Testicle			8, 8, 9, 11	9, 9, 9, S	8, 8, 11, S	S, S, S, S	2, 8, 10, S	S, S, S, S	Growth, base slant	80,000

[1] S=Survived

[2] None apparent.

The presence of foci of lymphocytic infiltration in the organs of these (monkeys 754, 30, and 41) and of other choriomeningitis-infected monkeys during the acute stages of the disease, as well as the occasional occurrence of actual foci of necrosis in certain organs, as the liver, adrenals and parathyroids, as observed by Surgeon R. D. Lillie, furnishes confirmatory evidence of the wide distribution of the virus.

For a further consideration of the histopathology the reader is referred to the detailed pathological report by Surgeon R. D. Lillie, (2), based on the examination of tissues from 51 monkeys. (The article immediately following.—Ed.)

SUMMARY

Monkeys experimentally infected with the virus of choriomeningitis were shown, by mouse inoculation, to harbor the virus in large amounts in all the organs and tissues tested; namely: adrenals, cerebrum, blood, kidneys, liver, lungs, lymph glands, marrow, heart muscle, voluntary muscle, pancreas, spinal cord, spinal fluid, spleen, submaxillary glands, and testicle. This distribution of virus is not explainable by the presence of virus-containing blood in the vessels.

REFERENCES

(1) Armstrong, C., and Lillie, R. D.: Experimental lymphocytic choriomeningitis of monkeys and mice produced by a virus encountered in studies of the 1933 St. Louis encephalitis epidemic. Pub. Health Rept., 49; 1019–1027 (1934).

(2) Lillie, R. D.: Pathologic histology of lymphocytic choriomeningitis in monkeys. Pub. Health Rept., this issue (following article).

PATHOLOGIC HISTOLOGY OF LYMPHOCYTIC CHORIOMENINGITIS IN MONKEYS

By R. D. Lillie, *Surgeon, United States Public Health Service*

The purpose of the present communication is to amplify the findings on the brain previously reported by Armstrong and Lillie, 1934 (1) and to report the lesions produced in the other viscera.

The material was derived from 51 monkeys used in Armstrong's experimental studies. In a considerable number of these only the brain was available, but in about half of the animals fairly complete material was studied histologically. Tissues were fixed routinely in Orth's bichromate formalin, imbedded and sectioned in paraffin, and stained routinely with our Romanowsky technique and with iron hematoxylin and picrofuchsin.

Forty-two monkeys died or were killed *in extremis* at intervals of 6 to 17 days after inoculation, the mean survival period being 11 days.

Nine monkeys survived for longer periods, 27 days up to 1 year, and were studied principally for the demonstration of the persistence of lesions over prolonged periods.

Survival periods

Days	6	7	8	9	10	11	12	13	14	15	16	17	27	32	34	40	55	81	7 months	1 year
Number of monkeys	2	2	1	5	7	4	6	4	2	3	1	3	1	1	1	1	1	1	2	1

The *brain* was studied histologically in 51 monkeys, the *spinal cord* in 35, and spinal *root ganglia* in 7. The *meninges* showed a slight to moderate focal to diffuse lymphocyte infiltration occurring generally, not especially more marked in sulci and fissures. It was somewhat more marked over the frontal cortex and cerebellum, and was slight on the spinal cord. In a few animals, plasma cells and macrophages were present as well. Congestion was common, and hemorrhage was frequent. The last finding was discounted considerably, as the brains were usually removed within a few minutes after death while the blood was still unclotted, and, hence, much of the hemorrhage was considered artefact. Cellular infiltration of the meninges was present in 39 of the 42 animals dying in less than 18 days, while of the 9 monkeys surviving for prolonged periods, 4 showed absence of meningeal cellular exudation. The latest survivor showing focal meningeal lymphocyte infiltration died 81 days after inoculation.

The *plexus chorioidei* almost constantly showed at least a focal lymphocyte infiltration. More often the plexus was swollen and densely and diffusely infiltrated by lymphocytes. In the 2 animals dying in the early period and not showing plexal infiltration, plexus of only one ventricle was present in the material, and infiltration may well have been present in other areas. Congestion, serous exudation, and participation of plasma cells and macrophages in the plexal infiltration occurred in some of the earlier cases. Serous and serocellular exudates in the ventricles were seen in 11 monkeys. Lymphocytes, red corpuscles, and macrophages were the usual cellular constituents, and polymorphonuclears were found only in one case.

The infiltration of the plexus chorioidei was not uniform. It was perhaps dense in one plexus, or part of one, and scanty or absent in other areas. Commonly, it was focal and sparser in the later survivors, perhaps limited to the base of the plexus. A slight focal infiltration was still present in the animal surviving 1 year after inoculation.

Subependymal edema and focal lymphocyte infiltration were present in a few animals. Ependymal desquamation, both from the walls and from the plexal villi, were noted in a number of animals.

In the brain substance there were only occasional small vessels mantled by lymphocytes and a few small nodes of glia cells. In one-third of the animals none was found, and in many only 3 or 4 focal lesions could be demonstrated in 12 to 20 sections of the brain.

The *spinal cord* was normal in 18 of 35 monkeys. Congestion and focal hemorrhages in the gray substance were found in 7, and a few focalglioses or focal perivascular lymphocyte infiltrations in 10 monkeys.

The *spinal root ganglia* regularly showed slight to moderate sheath cell proliferation, focal lymphocyte infiltration, or both. The ganglion cells were normal.

The *heart* was studied histologically in 23 monkeys. In 10 the muscle was normal, in 3 there were slight granularity and indistinctness of the cross striations, and in 10 there was a slight to moderate focal lymphocyte infiltration in the myocardium or occasionally epi- or endocardium. One monkey showed a few sarcosporidia in the muscle fibers.

In 8 of 21 monkeys the *larynx* and *trachea* showed a slight to moderate diffuse or focal lymphocyte infiltration of the mucosa. In the remainder no significant lesions were seen.

In 9 of 22 monkeys the *lung* was normal. In two there was a nodular, purulent pneumonia, with congestion, edema, and fibrinopurulent pleurisy. Two monkeys presented a parasitic bronchiectasis and bronchitis. In five there were patchy to diffuse congestion, serous alveolar exudation, and nodular paravascular or perivascular lymphocyte infiltration. Two of these showed also a marked perivascular edema, and one of them a nodular hemorrhagic consolidation. In two other animals patchy and diffuse congestion and serous alveolar exudation, respectively, were seen, in the latter with perivascular edema and focal alveolar hemorrhages. The two remaining monkeys showed focal perivascular lymphocyte infiltration, alone in one and with alveolar hemorrhages in the other.

It appears that the congestion, serous exudation, edema, and perivascular lymphocyte infiltration of greater or less extent form the essential picture of the pulmonary reaction to the virus of lymphocytic choriomeningitis.

The *submaxillary gland* was examined in 17 animals. In 15 it was normal. In two there were several hyperplastic lymphoid follicles, and in one of these there was a concurrent focal interstitial lymphocyte infiltration.

The *esophagus* was normal in 14 monkeys and in 1 showed a slight focal lymphocyte infiltration of the mucosa.

The *gastric* mucosa was regularly more or less infiltrated by lymphocytes. The infiltration was slight in two, moderate in five, "patchy" in four, "superficial" in one, "normal" in two, and marked in four.

In one of the last group appreciable numbers of plasma cells were present as well. A catarrhal exudate was present in one monkey, and a patchy lymphocyte infiltration of the serosa in another.

Reticulum cell hyperplasia in lymph follicles was noted in the *small intestine* in 2 monkeys (13 and 15 days), slight edema of the mucosa in 2, and in the remaining 12 it was considered normal.

In 11 of 17 monkeys the *large intestine* was normal. Two showed catarrhal or mucopurulent colitis and parasitic abscesses (nematodes), with local peritonitis in the serosa. Two showed a simple catarrhal colitis. Two showed ulcerative colitis, acute necrotizing and subacute fibrosing, respectively. None of these changes appears significant in relation to lymphocytic chorimeningitis.

The *pancreas* was examined in 22 monkeys. It was normal in 17, acute intercurrent processes of dubious significance were present in 3, and in 2 there was an irregular periductal or interstitial lymphocyte infiltration.

The *liver* was examined histologically in 24 monkeys; in 3 it was normal. In 10 there was slight to marked fatty infiltration, without other changes in 5, with congestion in 1, with periportal lymphocyte infiltration in 2, with both in 1, and with midzonal foci of lymphocyte infiltration and Kupffer cell hemosiderosis in 1. In another monkey moderate periportal lymphocyte infiltration and an excess of lymphocytes in the capillaries were the only findings. Periportal lymphoid cell infiltration and irregular sinusoidal Kupffer cell swelling and proliferation, with accumulation of polymorphonuclear leucocytes and large and small lymphocytes, were seen in another. In two monkeys small midzonal nodules of lymphocytes with swollen endothelial or epithelioid cells were seen.

The foregoing findings are minor in character and probably not particularly significant. In the remaining seven monkeys there were focal necroses, and in four of them capillary thrombi. In one of these there was an acute pyogenic interstitial pancreatitis intercurrently fatal 55 days after the virus inoculation, and the scattered isolated coagulated liver cells, the diffuse fatty degeneration of the liver, and localized accumulation of hyaline and leucocytic capillary thrombi appear assignable to the intercurrent disease and not to virus action. In the remaining six the focal lesions appear to be assignable directly to virus action, though in two of them there was a concurrent infection with a not especially virulent vaccine virus. These six monkeys died 9, 11, 11, 11, 12, and 14 days after inoculation, just about the median death point (11 days) for all deaths due directly to the virus of lymphocytic choriomeningitis. The focal necroses were small, approximately 50 micra or less in diameter. They were composed variously of pale or oxyphil karyolytic liver cells, of nuclear and cellular debris, and of coarse-meshed fibrin

[illegible] nuclear fragments, variably numerous red corpuscles, and occasional coagulated liver cells. Only in one of these animals (9 days) was there a variable, irregular commixture of proliferating reticulum cells with the necrosis. In four monkeys there were also scattered to numerous isolated coagulated necrotic liver cells. Capillary thrombi were seen in three, some hyaline, some fibrinous, some of fragmenting leucocytes or caseous debris. Numerous mitoses in liver cells were present in one monkey.

No lesions of the *gall bladder* were encountered in the four monkeys in which it was studied histologically.

The *spleen* pulp in the earlier stages was usually more or less congested. Clumps of lymphoid cells were present in some animals, but absent in others. The follicles were hyperplastic in some, small and inactive in others. Sinus endothelial swelling was infrequent. Phagocytic activity of follicular or pulp reticulum cells was observed in a few animals 12 to 15 days after inoculation, but was inconstant. After the second week, the congestion disappeared and follicular activity was not common.

The femoral *bone marrow* was studied in 20 monkeys. In about half of these it remained predominantly fatty, the remainder showing more or less cellularity. Generally, neutrophil myelocytes were predominant, and fair numbers of metamyelocytes and leucocytes were present. Only occasionally were myeloblasts appreciably increased in numbers. Usually fair numbers of erythroblastic cells were present in the more cellular marrows. Megakaryocytes were present in average numbers and occasionally showed nuclear pyknosis. There were no focal lesions assignable to the disease.

The *lymph nodes* generally presented more or less hyperplasia of follicles and of the sinus reticulo-endothelium. Crowding of the sinuses with macrophages and erythrophagia were infrequent findings. Pulp and follicular reticulum cells were often swollen and contained ingested nuclear debris or hemosiderin. Focal granulomata were observed in the superficial regional nodes of two monkeys. One of these (9 days) showed a small, solid, epithelioid cell nodule, the other (34 days) caseopurulent foci bordered by polymorphonuclears, lymphocytes, plasma cells and proliferating epithelioid cells, and fibroblasts with some delicate collagen fibrils.

The *kidney* showed generally more or less finely granular swelling and marginal fraying of the epithelium of the convoluted and loop tubules, less often vacuolar or hydropic degeneration, and not infrequently more or less copious intratubular exudate. This exudate was usually a foamy or granular albuminous coagulum. Hyaline, granular, and, rarely, necrotic cellular casts occurred in a few animals.

In about two-thirds of the animals there was an exudative inflammation as well. This was most frequent and most marked in animals

dying 10 to 17 days after inoculation. The exudative cells were chiefly lymphocytes; sometimes some plasma cells and a few macrophages were present as well. The exudate occurred most often about arcuate vessels and as interstitial foci in the cortex. In about one-third of the monkeys there was a similar exudate beneath the parietal pelvic epithelium and in the pelvic fatty areolar tissues. Here there was inconstantly an accompanying serous exudation. The pelvic cellular exudate was partly diffuse, partly perivascular in distribution. Intraepithelial intercellular vesicles containing cell debris and macrophages were formed in the pelvic mucosa of one monkey (12 days). Lymphocyte infiltration of the cortex appeared as early as 9 days after inoculation and persisted as long as 34 and 55 days and 7 months. In 3 other monkeys it was absent at 81 days, 7 months, and 1 year after inoculation.

The inclusions in the nuclei of the convoluted and loop tubules described by Cowdry and Scott (2) were present in 7 of the 30 monkeys, or 23 percent. This proportion is not significantly different from that seen in 57 monkeys infected with poliomyelitis (21 percent). The significance of these inclusions is unknown.

In 13 of 22 monkeys the *adrenals* were normal. Two showed changes possibly assignable to intercurrent infections. In five there was more or less marked congestion, particularly in the zona reticularis, with focal hemorrhages in three. Focal lymphocyte infiltration of the zona reticularis and medulla was present in four monkeys, alone in one, and associated with congestion in three and with hemorrhages in two. One monkey dying 9 days after inoculation showed focal coagulation necrosis of cortical tissue, grading from isolated coagulated cells to focal necroses 0.1 mm in diameter. There was no marginal reaction about these necroses.

The *urinary bladder* was normal in 6 of 13 monkeys One showed a patchy edema of the mucosa, one a patch of serosal mesothelial proliferation, submesothelial focal caseous necrosis and satellite perivascular lymphocyte and plasma cell infiltration, and two a focal perivascular and subepithelial lymphocyte infiltration of the mucosa. In three there was a hemorrhagic cystitis characterized by focal interstitial and subepithelial hemorrhages in the mucosa, concentric vascular endothelial swelling or proliferation, and perivascular and interstitial infiltration by lymphocytes in the mucosa. In one lymphoid follicles were formed, in one numbers of polymorphonuclear leucocytes were present in the epithelium, and in the third the epithelium contained scattered, swollen, clear epithelial cells grading into rounded clear spaces containing nuclear fragments and eosinophil globules and masses.

Testicles were studied in 15 monkeys and were normal in 6. In two the lesions present were probably assignable to intercurrent infection.

In five the testis was normal, with a focal lymphocyte infiltration of the cremaster and tunica vaginalis (two cases) or a more or less dense diffuse and perivascular lymphocyte infiltration in the epididymis (three cases). In two further monkeys there were, respectively, a slight focal (12 days) and a diffuse interstitial lymphocyte infiltration (20 days) of the testis, moderate diffuse and focal lymphocyte infiltration, slight edema, and a few plasma cells in the epididymis of the one monkey (12 days), and dense diffuse lymphocyte infiltration of epididymis, cremaster, and tunica vaginalis, with diffuse parietal and focal visceral stratifying proliferation of the tunical mesothelium (20 days). These exudative inflammatory changes appeared as early as 9 days and as late as 55 days after inoculation. In the last-noted monkey one testicle was normal. In the monkey showing the most severe changes in the testis excised 20 days after inoculation, the other testicle was normal at autopsy 2 months later.

Ovary, *uterus*, and *tube* were studied in six monkeys. All showed focal lymphocyte infiltration of greater or less extent and density. The mucosa of the tube was involved in five, the tubal muscularis as well in one, the myometrium in three, with the perimetrium as well in one, the ovarian stroma in one, and the broad ligaments in three. In one monkey there were necrosis and desquamation of thecal epithelium. The ovary was normal in four, the uterus in three, and the tube in one only.

Thymus was studied in four monkeys. None showed any lesions.

The *thyroid* was examined in 18 monkeys and showed no significant lesions in any.

Parathyroids were encountered in thyroid sections in nine animals. In five no lesions were seen, a single focus of acute karyorrhectic necrosis without marginal reaction was seen in one monkey (12 days), and focal perivascular lymphocyte infiltration was seen in three. In one of these last there were associated plasma cells and clumps of nuclear debris; but as a concurrent infection was present in this animal, the significance is doubtful.

Skeletal *muscle* was studied in 17 monkeys. In one there was a sparse focal lymphocyte infiltration. Three showed sarcosporidia and the remainder were normal.

SUMMARY

Lymphocytic choriomeningitis in monkeys is characterized by an almost constant, irregular, more or less pronounced lymphocyte infiltration of the plexus chorioidei of the cerebral ventricles, sometimes accompanied by serocellular exudation into the ventricles, by an almost constant, usually quite moderate, irregularly distributed lymphocyte infiltration of the leptomeninges, and by very few foci

of cellular gliosis and of vessel sheath lymphocyte infiltration in the brain and cord substance. Meningeal and plexus infiltration may persist for long periods after infection. Focal lymphocyte infiltration and sheath cell proliferation occur in the spinal root ganglia.

The lungs often present congestion, serous exudation, interstitial edema, hemorrhages, and perivascular lymphocyte infiltration. Pyelitis and a sometimes hemorrhagic cystitis occur in a number of animals and are characterized by focal and diffuse mucosal lymphocyte infiltration and edema. Foci of coagulative to fibrinoid hemorrhagic necrosis in the liver are seen in about one fourth of the animals, and focal necroses also occur occasionally in the adrenal and parathyroid. Splenic congestion, a variable grade of marrow hyperplasia and lymph node follicle hyperplasia, and sinus reticulo-endotheliosis are other frequent findings.

A focal interstitial or perivascular lymphocyte infiltration is frequent in the kidney, epididymis, uterus, tube, parathyroid, heart, lung, and tracheal mucosa, and occasional in esophageal mucosa, pancreas, adrenal, testis, ovary, and skeletal muscles.

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(2) Cowdry, E. V., and Scott, G. H.: Nuclear inclusions in the kidneys of *Macacus rhesus* monkeys. Am. Jour. Path., 11: 659–668 (1935).

DEATHS DURING WEEK ENDED FEB. 29, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Feb. 29, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	10,573	9,473
Deaths per 1,000 population, annual basis	14.8	13.2
Deaths under 1 year of age	580	691
Deaths under 1 year of age per 1,000 estimated live births	52	64
Deaths per 1,000 population, annual basis, first 9 weeks of year	13.7	13.0
Data from industrial insurance companies.		
Policies in force	67,956,142	67,432,737
Number of death claims	16,328	15,021
Death claims per 1,000 policies in force, annual rate	12.6	11.6
Death claims per 1,000 policies, first 9 weeks of year, annual rate	10.8	10.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Mar. 7, 1936, and Mar. 9, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 7, 1936, and Mar. 9, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar 7, 1936	Week ended Mar. 9, 1935	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935	Week ended Mar 7, 1936	Week ended Mar. 9, 1935	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935
New England States:								
Maine	1	2	5	214	263	538	0	0
New Hampshire					55	16	0	0
Vermont	1				567	4	0	0
Massachusetts	2	5			819	471	8	2
Rhode Island	1				39	112	0	0
Connecticut	2	7	26	2	89	997	1	3
Middle Atlantic States:								
New York	37	21	[1] 109	[1] 20	2,368	2,226	30	15
New Jersey	14	17	89	14	148	1,058	5	3
Pennsylvania	48	60			776	5,103	14	4
East North Central States:								
Ohio [3]	29	41	39	28	258	810	9	9
Indiana	19	18	82	70	15	468	3	3
Illinois	85	45	63	71	57	2,709	20	19
Michigan	10	18	6	13	87	2,340	2	1
Wisconsin	3	1	89	98	76	2,290	2	0
West North Central States:								
Minnesota	3	5			272	1,813	1	3
Iowa	4	5	8		3	1,163	1	6
Missouri	21	28	618	243	63	873	7	7
North Dakota	1	9	6	27	1	33	2	0
South Dakota	3	1		5	14	38	0	0
Nebraska	3	6			88	336	0	1
Kansas	12	4	65	21	15	1,255	0	1
South Atlantic States:								
Delaware	3	2		2	69	2	1	0
Maryland [3]	8	9	70	72	195	141	15	2
District of Columbia	19	13	4	8	16	32	3	11
Virginia	15	11	2,046		84	1,216	24	4
West Virginia	14	21	135	234	8	518	11	3
North Carolina [4]	14	9	343	67	58	607	2	4
South Carolina [5]	2	5	1,005	425	16	62	1	15
Georgia [5]	13	15	1,544	387			13	0
Florida	4	9	61	39	4	36	1	0
East South Central States:								
Kentucky	15	15	73	103	62	1,141	16	4
Tennessee	24	13	477	228	79	89	29	9
Alabama [5]	13	8	2,140	761	63	433	1	4
Mississippi [3]	5	9					1	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 7, 1936, and Mar. 9, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935	Week ended Mar. 7, 1936	Week ended Mar 9, 1935	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935
West South Central States:								
Arkansas	8	8	346	118	1	41	0	2
Louisiana	18	22	141	27	70	175	0	3
Oklahoma [4]	11	20	208	505	5	188	11	9
Texas [5]	62	72	1,279	2,589	648	163	5	9
Mountain States:								
Montana	1	6	23	-------	18	111	3	0
Idaho	0	-------	1	4	20	46	0	0
Wyoming	-------	4	-------	-------	12	211	0	1
Colorado	8	9	-------	-------	8	708	0	1
New Mexico	2	7	9	9	44	-------	0	2
Arizona	4	1	213	105	81	20	0	0
Utah [3]	-------	1	-------	-------	20	28	0	2
Pacific States:								
Washington	1	3	11	5	329	207	2	2
Oregon	3	-------	269	144	564	95	1	1
California	32	42	2,099	377	2,729	398	11	7
Total	548	627	18,792	7,030	11,276	31,522	256	174
First 10 weeks of year	6,466	7,616	63,757	82,558	69,341	209,217	2,031	1,161

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935	Week ended Mar. 7, 1936	Week ended Mar 9, 1935	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935
New England States								
Maine	0	0	14	22	0	0	0	0
New Hampshire	1	0	13	2	0	0	0	0
Vermont	0	0	20	17	0	0	0	0
Massachusetts	0	0	289	208	0	0	0	1
Rhode Island	0	0	9	15	0	0	0	0
Connecticut	0	0	126	70	0	0	0	0
Middle Atlantic States								
New York	1	3	1,420	952	0	0	10	4
New Jersey	1	0	617	166	0	0	2	0
Pennsylvania	1	0	611	675	0	0	6	2
East North Central States:								
Ohio [3]	1	1	454	1,083	1	0	1	3
Indiana	0	0	267	237	3	1	3	0
Illinois	0	2	996	1,046	22	1	5	6
Michigan	0	0	334	423	1	0	3	2
Wisconsin	1	0	604	508	9	22	2	1
West North Central States.								
Minnesota	1	1	362	150	9	7	0	0
Iowa	0	1	155	67	13	1	3	1
Missouri	1	0	195	66	6	2	0	5
North Dakota	0	0	68	211	1	3	0	0
South Dakota	0	0	40	11	15	1	5	0
Nebraska	0	0	202	37	21	17	0	1
Kansas	2	0	266	94	26	32	1	0
South Atlantic States:								
Delaware	0	0	7	29	0	0	0	0
Maryland [3]	0	0	99	109	0	0	2	2
District of Columbia	0	0	34	65	0	0	0	0
Virginia	1	0	56	28	0	0	2	2
West Virginia	0	0	49	158	0	1	1	2
North Carolina [4]	0	0	43	41	1	0	3	1
South Carolina [5]	0	0	4	5	0	0	0	3
Georgia [5]	0	0	12	11	1	0	1	1
Florida	1	0	2	8	0	12	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 7, 1936, and Mar. 9, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935	Week ended Mar 7, 1936	Week ended Mar 9, 1935	Week ended Mar 7, 1936	Week ended Mar. 9, 1935	Week ended Mar. 7, 1936	Week ended Mar. 9, 1935
East South Central States:								
Kentucky	0	0	72	54	1	1	2	4
Tennessee	1	0	34	30	2	0	1	3
Alabama [3]	1	0	18	12	2	0	1	1
Mississippi [3]	0	0	8	13	0	1	0	2
West South Central States:								
Arkansas	0	0	14	5	0	2	0	1
Louisiana	0	0	17	14	2	2	7	5
Oklahoma [6]	1	0	22	16	0	2	3	1
Texas [5]	0	1	87	121	9	30	1	14
Mountain States:								
Montana	0	0	111	19	7	0	0	1
Idaho	0	0	75	2	4	0	0	1
Wyoming	0	0	152	49	12	14	0	0
Colorado	0	1	136	354	13	1	0	0
New Mexico	0	0	88	16	0	0	2	3
Arizona	0	0	20	24	0	0	0	0
Utah [3]	0	0	103	102	1	0	0	0
Pacific States:								
Washington	0	1	100	72	14	29	1	3
Oregon	1	0	59	54	2	0	0	0
California	1	13	387	266	4	3	3	4
Total	17	24	8,871	7,747	202	185	72	85
First 10 weeks of year	204	273	75,040	67,815	2,230	1,944	1,045	1,346

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended Mar. 7, 1936, Ohio, 1 case.
[3] Week ended earlier than Saturday.
[4] Dengue, week ended Mar 7, 1936, North Carolina, 1 case.
[5] Typhus fever, week ended Mar. 7, 1936, 15 cases, as follows: South Carolina, 1; Georgia, 7; Alabama, 2; Texas, 5.
[6] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January 1936										
Virginia	15	101	1,291		92	4	1	221	0	17
February 1936										
Arkansas	7	30	596	39	6	20	1	58	1	4
Connecticut	7	5	34		430		1	320	0	3
Delaware	1				289		0	28	0	1
District of Columbia	19	95	15		61		1	105	0	2
Indiana	12	127	158		92		0	1,458	3	13
Iowa	20	40	21		38		0	627	59	15
North Carolina	17	83	1,107		195	40	1	119	2	12
South Carolina		84	5,900	162	61	62	3	21	1	1

Summary of monthly reports from States—Continued

January 1936

	Cases
Virginia:	
Chicken pox	264
Diarrhea and dysentery	28
Mumps	232
Septic sore throat	3
Tularaemia	16
Undulant fever	4
Whooping cough	108

February 1936

	Cases
Anthrax:	
Delaware	1
Chicken pox:	
Arkansas	74
Connecticut	513
Delaware	44
District of Columbia	72
Indiana	304
Iowa	203
North Carolina	562
South Carolina	110
Conjunctivitis, infectious:	
Connecticut	63
Diarrhea:	
South Carolina	213
Dysentery.	
Connecticut (amoebic)	1
Connecticut (bacillary)	1

February, 1936—Continued

	Cases
Epidemic encephalitis:	
Connecticut	1
Indiana	2
South Carolina	4
German measles:	
Connecticut	718
Delaware	1
North Carolina	390
South Carolina	25
Hookworm disease:	
South Carolina	43
Mumps:	
Arkansas	177
Connecticut	320
Delaware	81
Indiana	308
Iowa	905
South Carolina	179
Ophthalmia neonatorum:	
North Carolina	1
South Carolina	3
Paratyphoid fever:	
Connecticut	3
Rabies in animals:	
Indiana	46
South Carolina	32

February, 1936—Continued

	Cases
Septic sore throat:	
Connecticut	12
Iowa	3
North Carolina	2
Tetanus:	
Connecticut	3
South Carolina	6
Trachoma:	
Arkansas	3
Trichinosis:	
Connecticut	1
Tularaemia:	
North Carolina	2
Typhus fever:	
Connecticut	1
North Carolina	2
South Carolina	4
Undulant fever:	
Connecticut	7
Iowa	6
North Carolina	3
Whooping cough:	
Arkansas	34
Connecticut	288
Delaware	61
District of Columbia	33
Indiana	137
Iowa	38
North Carolina	109
South Carolina	60

WEEKLY REPORT FROM CITIES

City reports for week ended Feb 29, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	2	0	0	4	2	0	1	0	10	27
New Hampshire.											
Concord	0		0	0	0	0	0	0	0	0	12
Manchester	0		1	0	0	3	0	1	0	0	18
Nashua	0			2		0	0		0	0	
Vermont.											
Barre											
Burlington	0		0	0	0	0	0	0	0	0	8
Rutland	0		1	6	2	6	0	0	0	0	10
Massachusetts.											
Boston	1		1	287	36	65	0	11	1	9	243
Fall River	1		2	2	8	3	0	0	0	0	43
Springfield	0		0	0	2	5	0	1	0	9	39
Worcester	0		0	1	8	15	0	0	0	3	64
Rhode Island											
Pawtucket	0		0	0	0	1	0	0	0	0	24
Providence	0		1	25	19	12	0	3	0	0	86
Connecticut											
Bridgeport	0	3	1	4	0	3	0	0	0	6	31
Hartford											
New Haven	0	1	0	1	4	0	0	2	1	36	44
New York:											
Buffalo	0		0	35	29	65	0	14	0	10	194
New York	39	78	16	1,489	286	600	0	98	2	88	1,892
Rochester	0	2	0	0	10	4	0	2	0	2	98
Syracuse	0		0	56	4	3	0	2	1	10	57
New Jersey:											
Camden	2	3	1	0	1	6	0	0	0	1	33
Newark	0	28	0	2	17	245	0	6	1	22	139
Trenton	0		0	2	5	5	0	2	0	16	32
Pennsylvania:											
Philadelphia	5	19	9	395	68	68	0	35	0	54	635
Pittsburgh	10	9	4	44	51	105	0	6	0	20	229
Reading	0		0	3	1	5	0	1	0	0	26
Scranton	0			81		6	0		0	2	

City reports for week ended Feb. 29, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Ohio:											
Cincinnati	4	------	7	14	26	28	0	12	0	2	181
Cleveland	0	48	4	72	25	52	0	18	0	61	223
Columbus	7	6	6	5	12	15	0	6	0	2	107
Toledo	0	1	1	37	8	5	0	8	0	3	78
Indiana:											
Anderson	1	------	0	0	3	3	0	0	0	2	10
Fort Wayne	3	------	0	0	4	12	0	1	0	0	27
Indianapolis	0	------	0	1	31	27	0	2	0	23	130
Muncie	0	------	0	1	1	4	0	0	0	0	12
South Bend	0	------	0	0	5	5	0	0	0	7	17
Terre Haute	0	------	0	0	1	4	0	0	0	0	37
Illinois:											
Alton	0	------	1	0	4	1	0	0	0	3	19
Chicago	14	14	10	11	69	259	1	44	1	212	802
Elgin	0	1	1	0	0	2	0	1	0	0	12
Moline	0	------	1	0	6	55	0	1	0	2	15
Springfield	0	------	0	0	7	25	0	0	0	3	32
Michigan:											
Detroit	5	6	3	17	52	133	0	15	0	135	293
Flint	1	------	0	2	5	13	0	0	0	22	33
Grand Rapids	0	------	0	5	1	11	0	0	0	6	34
Wisconsin:											
Kenosha	0	------	0	1	2	3	0	0	0	5	10
Milwaukee	0	3	1	5	9	121	0	7	0	52	112
Racine	0	------	0	0	1	26	0	0	0	5	19
Superior	0	------	0	0	0	5	0	0	0	0	7
Minnesota:											
Duluth	0	------	0	1	2	3	0	2	0	6	22
Minneapolis	2	------	2	107	9	139	0	0	0	10	103
St. Paul	0	2	2	129	13	33	0	0	0	6	68
Iowa:											
Cedar Rapids	0	------	--------	1	-------	1	0	-------	0	3	--------
Davenport	1	------	--------	0	-------	6	0	-------	0	1	--------
Des Moines	1	------	--------	0	10	5	0	2	0	0	49
Sioux City	0	------	--------	0	-------	13	11	-------	0	0	--------
Waterloo	1	------	--------	0	-------	5	0	-------	0	0	--------
Missouri:											
Kansas City	2	19	1	3	18	61	0	6	0	0	152
St. Joseph	0	------	5	0	23	5	0	3	0	0	99
St. Louis	8	3	0	3	26	88	0	10	0	5	297
North Dakota:											
Fargo	0	------	0	0	0	11	0	0	0	0	4
Grand Forks	0	------	--------	0	-------	0	5	-------	0	0	--------
Minot	0	------	0	0	0	15	0	0	0	0	2
South Dakota:											
Aberdeen	0	------	--------	1	-------	0	0	-------	0	0	--------
Sioux Falls	0	------	0	0	0	8	3	0	0	0	9
Nebraska:											
Omaha	0	------	0	1	19	131	0	1	0	1	80
Kansas:											
Lawrence	0	------	0	0	5	1	1	0	0	0	13
Topeka	0	------	0	1	5	54	0	2	0	1	35
Wichita	1	2	2	0	13	21	1	2	0	4	45
Delaware:											
Wilmington	0	------	0	2	5	1	0	1	0	3	39
Maryland:											
Baltimore	5	29	8	23	29	36	0	14	0	21	295
Cumberland	0	------	0	1	2	6	0	0	0	0	18
Frederick	0	1	1	0	0	0	0	0	0	0	3
District of Col.:											
Washington	22	5	4	25	32	30	0	22	1	7	226
Virginia:											
Lynchburg	0	------	1	0	6	0	0	0	0	8	16
Norfolk	1	------	2	0	5	6	0	2	0	0	30
Richmond	1	10	6	0	9	21	0	4	0	3	80
Roanoke	2	------	0	1	8	4	0	1	0	0	23
West Virginia:											
Charleston	2	6	0	0	3	0	0	0	0	0	20
Huntington	0	------	0	0	0	0	0	0	0	0	0
Wheeling	1	------	0	2	3	1	0	0	0	0	18
North Carolina:											
Gastonia	0	4	0	1	3	0	0	0	0	0	--------
Raleigh	0	------	0	0	6	0	0	0	0	2	27
Wilmington	0	9	0	0	3	1	0	1	0	0	13
Winston-Salem	0	4	1	117	6	3	0	1	0	0	21

City reports for week ended Feb. 29, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
South Carolina:											
Charleston	1	394	4	0	11	3	0	1	0	0	38
Columbia											
Florence	0		6	0	5	0	0	0	0	0	13
Greenville	0		0	7	2	0	0	0	0	0	6
Georgia:											
Atlanta	4	502	18	1	33	13	0	5	0	1	122
Brunswick	0		0	1	5	0	0	0	0	0	7
Savannah	0	339	5	0	3	2	0	1	0	0	29
Florida:											
Miami	2		0	2	1	0	0	1	3	4	40
Tampa	0	3	1	0	4	0	0	4	1	0	36
Kentucky:											
Ashland	1	4		0		0	0		0	1	
Covington	0		0	4	4	0	0	0	0	3	38
Lexington	0		0	0	5	2	0	0	0	0	25
Louisville	2	6	2	6	19	22	0	3	0	11	
Tennessee:											
Knoxville	3	9	2	51	6	3	0	1	0	0	42
Memphis	4		5	2	27	6	0	8	0	2	122
Nashville	1		4	0	10	2	0	3	0	0	70
Alabama:											
Birmingham	3	223	5	0	11	4	0	2	0	0	84
Mobile	1	95	2	2	2	1	0	1	0	0	25
Montgomery	1	57		0		2	0		0	0	
Arkansas:											
Fort Smith											
Little Rock	2	2	0	0	2	3	0	1	0	0	8
Louisiana:											
New Orleans	11	20	6	22	29	15	0	17	0	8	203
Shreveport	2		0	17	13	0	0	3	0	0	41
Oklahoma:											
Oklahoma City	1	20	0	0	20	7	0	0	0	0	55
Texas:											
Dallas	4	5	3	112	12	2	0	7	0	1	79
Fort Worth	3		6	2	13	13	0	3	0	1	66
Galveston	1		0	7	7	0	0	4	0	0	30
Houston	11		2	18	20	1	0	12	0	6	102
San Antonio	1		9	0	9	3	0	9	0	0	92
Montana:											
Billings	0		0	0	2	10	0	0	0	3	9
Great Falls	0		0	0	1	11	0	0	0	1	8
Helena	0		0	0	0	1	0	0	0	0	4
Missoula	0		0	0	0	11	0	0	0	0	1
Idaho:											
Boise	0		0	3	2	14	0	0	0	0	8
Colorado:											
Colorado Springs	1		0	5	0	6	0	2	0	4	18
Denver	4		3	6	21	34	0	2	2	13	108
Pueblo	0		0	0	2	16	0	0	0	3	9
New Mexico:											
Albuquerque	0		1	0	3	26	0	2	0	4	12
Utah:											
Salt Lake City	1		0	0	2	112	0	1	0	9	
Washington:											
Seattle	0		6	71	15	30	0	14	0	5	131
Spokane	0	5	5	5	3	11	0	1	0	3	40
Tacoma	0		0	85	11	2	0	0	0	0	40
Oregon:											
Portland	0	27	3	366	13	8	0	0	0	3	104
Salem	0	4		1		2	0		0	0	
California:											
Los Angeles	7	203	1	575	31	122	0	18	1	15	350
Sacramento	2	80	2	21	4	6	0	5	0	4	48
San Francisco	0	18	5	421	9	71	0	11	1	13	230

City reports for week ended Feb. 29, 1936—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	8	4	1
Worcester	1	2	0
Rhode Island:			
Providence	1	0	0
New York:			
New York	24	4	1
New Jersey:			
Newark	2	1	0
Pennsylvania:			
Philadelphia	2	1	0
Pittsburgh	2	1	0
Ohio:			
Cincinnati	3	1	0
Cleveland	0	0	2
Illinois:			
Chicago	6	4	0
Michigan:			
Detroit	0	1	0
Grand Rapids	1	0	0
Minnesota:			
Minneapolis	1	0	0
Iowa:			
Sioux City	0	1	0
Missouri:			
Kansas City	2	1	0
St. Joseph	6	4	0
St. Louis	1	0	0
Delaware:			
Wilmington	1	1	0
Maryland:			
Baltimore	11	7	0
District of Columbia:			
Washington	7	4	0
Virginia:			
Norfolk	1	0	0
Richmond	5	2	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
South Carolina:			
Charleston	17	0	0
Georgia:			
Atlanta	7	4	0
Savannah	1	0	0
Florida:			
Miami	1	1	0
Kentucky:			
Ashland	1	1	0
Louisville	2	1	0
Tennessee:			
Knoxville	2	0	0
Memphis	1	2	0
Alabama:			
Birmingham	0	1	0
Louisiana:			
New Orleans	2	2	0
Shreveport	0	4	0
Oklahoma:			
Oklahoma City	2	1	0
Texas:			
Houston	5	2	0
Colorado:			
Colorado Springs	0	1	0
Denver	1	0	0
Utah:			
Salt Lake City	1	0	0
Washington:			
Seattle	1	0	0
Oregon:			
Portland	0	0	1
California:			
Los Angeles	5	1	6
Sacramento	0	1	0
San Francisco	2	0	0

Epidemic encephalitis.—Cases: Newark, 1; Baltimore, 1.
Pellagra.—Atlanta, 1; Montgomery, 1; Dallas, 1; Albuquerque, 1.
Typhus fever.—Cases: Philadelphia, 1.

FOREIGN AND INSULAR

BRAZIL

Malaria.—According to information dated February 15, 1936, an outbreak presumed to be pernicious malaria has been reported on Lago Grande located between Santa Rem and Obidos, about 500 miles from Para, Brazil.

BRITISH WEST INDIES

Island of Dominica—Vital statistics—1935.—Following are vital statistics for the Island of Dominica, British West Indies, for the year 1935:

Birth rate per 1,000 population	31.05
Stillbirths per 100 live births	4.88
Infant mortality rate per 1,000 live births	97.60
Deaths per 1,000 population	14.58
Deaths from:	
All causes	683
Diarrhea and enteritis (under 2 years)	28
Diarrhea and enteritis (2 years and over)	17
Dysentery (amoebic)	2
Deaths from—Continued.	
Dysentery (bacillary or undefined)	13
Influenza	42
Malaria	47
Tetanus	2
Tuberculosis (all forms)	71
Typhoid fever	2
Yaws	1

CANADA

Communicable diseases—2 weeks ended February 22, 1936.—During the 2 weeks ended February 22, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				2	3	1		1		7
Chicken pox		21	2	334	547	49	34	47	185	1,219
Diphtheria		12	4	20	7	9	5	3	1	61
Dysentery				2	2					4
Erysipelas				11	8	2		3	2	26
Influenza		4	1		266	20			50	341
Lethargic encephalitis					1					1
Measles	10	58	33	2,579	4,413	970	1,275	225	745	10,308
Mumps		20			1,069	94	310	71	350	1,914
Paratyphoid fever	1				3					4
Pneumonia	2	2			55				20	79
Poliomyelitis					1					1
Scarlet fever		19	8	239	677	136	31	90	61	1,261
Trachoma									1	1
Tuberculosis	4	3	6	116	84	31	18	3	28	293
Typhoid fever			1	29	8	5		4	2	49
Undulant fever				1				1		2
Whooping cough		15	6	164	413	21	56	19	98	792

DENMARK

Communicable diseases—October–December 1935.—During the months of October, November, and December 1935, cases of certain communicable diseases were reported in Denmark as follows:

Disease	October	November	December	Disease	October	November	December
Cerebrospinal meningitis	2	2	2	Paratyphoid fever	12	11	5
Chicken pox	19	55	75	Poliomyelitis	36	13	6
Diphtheria and croup	345	365	334	Puerperal fever	21	13	19
Epidemic encephalitis	4	4	2	Scabies	1,321	1,174	963
Erysipelas	343	335	302	Scarlet fever	990	812	632
German measles	6	9	52	Syphilis	77	68	73
Gonorrhea	1,052	894	728	Tetanus, neonatorum	2	4	1
Influenza	4,168	5,057	5,138	Tetanus, traumatic			2
Malaria	5	12	8	Typhoid fever	2	4	2
Measles	1,085	639	680	Undulant fever (Bact. abort. Bang)	47	45	32
Mumps	469	616	762	Whooping cough	3,321	3,582	2,941
Paradysentery	42	23	96				

JAMAICA

Communicable diseases—4 weeks ended February 22, 1936.—During the 4 weeks ended February 22, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		2	Poliomyelitis		1
Chicken pox	4	21	Scarlet fever		1
Dysentery	14	4	Tuberculosis	54	106
Leprosy		4	Typhoid fever	25	144

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for February 28, 1936, pages 227–240. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued March 27, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Argentina—Buenos Aires Province—Ingeniero White.—A report dated March 9, 1936, stated that 2 cases of plague with 2 deaths were reported at Ingeniero White, Buenos Aires Province, Argentina.

Brazil—Ceara State—Crato.—During the month of February 1936 7 cases of plague with 2 deaths were reported at Crato, Ceara State, Brazil.

Egypt—Minya Province.—During the week ended February 29, 1936, 2 cases of plague were reported in Minya Province, Egypt.

Smallpox

Algeria—Department of Algiers.—During the week ended February 15, 1936, 1 case of smallpox was reported in the Department of Algiers, Algeria.

Argentina.—A report dated March 9, 1936, states that smallpox has been reported in Argentina, as follows: Buenos Aires Province, Puerto Belgrano, 4 cases; Entre Rios Province, Lucas Norte, 5 cases, 2 deaths.

Egypt.—During the week ended February 15, 1936, 2 cases of smallpox were reported in Egypt.

Poland—Department of Lublin.—During the week ended February 8, 1936, 1 case of smallpox was reported in the Department of Lublin, Poland.

Typhus fever

Mexico—San Luis Potosi.—During the week ended February 29, 1936, 1 death from typhus fever was reported at San Luis Potosi, Mexico.

Yellow fever

Brazil.—Yellow fever has been reported in Brazil as follows: Minas Geraes State: Dores Campo, Formoso, February 9, 1936, 1 case, 1 death; Sao Thomaz de Aquino, February 4, 1936, 1 case, 1 death; Parana State, Londrina, February 17, 1936, 1 case, 1 death; Sao Paulo State, Araraquara, February 9, 1936, 1 case, 1 death; Santo Antonio Alegria, February 9, 1936, 1 case, 1 death.

Gold Coast—Kumasi.—During the week ended February 29, 1936, 1 fatal case of yellow fever was reported at Kumasi, Gold Coast.

Ivory Coast—Indenie Circle—Correction.—The fatal case of suspected yellow fever during the last 10 days of December 1935, in Indenie Circle, Ivory Coast, and published in the PUBLIC HEALTH REPORTS on pages 107, 137, and 240, has been rediagnosed as not due to yellow fever.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

W. F. DRAPER, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen R C WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

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RESULTS OF A DENTAL EXAMINATION OF 1,908 WHITE AND COLORED MALES AT THE OHIO STATE REFORMATORY

By W. M. Gafafer, *Senior Statistician*, and C. T. Messner, *Senior Dental Surgeon, United States Public Health Service*

The dental examinations upon which this report is based were made in connection with the nationwide survey of dental needs of children of school age conducted by the United States Public Health Service in cooperation with the committee for dental health survey of the American Dental Association. Of the various groups that were surveyed and for which complete examinations were returned to the Public Health Service, only one group included young adults exclusively. This particular group represented the inmates of the Ohio State Reformatory at Mansfield. It is logical to present the results of the examinations of this group separately from those of the children,[1] and it is with this thought that the present paper is offered. So far as is known, comparable data from a similar population have not been published.

MANSFIELD AND THE REFORMATORY

Mansfield, a manufacturing center and the county seat of Richland County, lies 75 miles southwest of Cleveland. The city occupies about 5 square miles of rolling ground over 1,000 feet above sea level in a rich agricultural region. In 1930 the population was 33,000. The reformatory, which is located in the suburbs of the city, was established in 1884 for the purpose of separating the younger offenders from the older and more hardened criminals of the Ohio Penitentiary and subsequently reforming them (1). The 3,372 offenders, all males, white and colored, 16 to 30 years of age, are from various parts of the State and were committed principally for the stealing of automobiles, burglary, and other larceny. About 75 percent of the inmates are white native Americans; 20 percent are colored. Only a negligible number attended high school or college. The activities at the institution include instruction in the regular school subjects, vocational

[1] A Public Health Bulletin, *Dental Survey of School Children, Ages 6-14 Years, Made in 1933-34 in 26 States*, has been submitted for publication.

training courses, building construction, factory work, farming, and systematic physical training. The time served by an inmate is, on the average, 18 months.

DENTAL FACILITIES AND ACTIVITIES AT THE REFORMATORY

The dental personnel is appointed by the superintendent of the reformatory upon the recommendation of the institution physician, and consists of one part-time dentist who is available daily, and one inmate assistant. When a boy is admitted to the institution he is given a dental examination; any cleanings, fillings, or extractions are free of charge to those wishing them. A sick call is held every day, and any dental complaints are made to the institution physician who, in turn, makes his recommendations to the dentist; as on admission, cleanings, fillings, and extractions are free of charge to those wishing them. The routine dental work of 1933 included 1,428 cleanings, 1,034 fillings, 1,467 extractions, and the examination of 1,625 boys who were either received from the courts or returned to the institution.

THE POPULATION EXAMINED

The total inmate population as of December 31, 1933, was 3,372; and of these 1,908, or 57 percent, constituted the examined population. Only those living inside the walls of the institution were examined; those living in dormitories outside the enclosure were excluded. Of those examined, 79 percent where white and 21 percent were colored; their ages ranged from 16 through 30 years. The general health of the group was good. Table 1 gives the number and percent of those examined, classified according to single years of age and color.

TABLE 1.—*Number and percent of males examined, classified by age and color* [1]

Age	Total		White males		Colored males	
	Number	Percent	Number	Percent	Number	Percent
Total	1,908	100.0	1,499	100.0	409	100.0
16	12	0.6	9	0.6	3	0.7
17	42	2.2	36	2.4	6	1.5
18	145	7.6	119	7.9	26	6.4
19	231	12.1	188	12.5	43	10.5
20	258	13.5	206	13.8	52	12.7
21	240	12.6	188	12.5	52	12.7
22	197	10.3	157	10.5	40	9.8
23	170	8.9	129	8.6	41	10.0
24	152	8.0	115	7.7	37	9.0
25	105	5.5	79	5.3	26	6.4
26	90	4.7	72	4.8	18	4.4
27	81	4.3	59	3.9	22	5.4
28	73	3.8	55	3.7	18	4.4
29	67	3.5	51	3.4	16	3.9
30	45	2.4	36	2.4	9	2.2

[1] Number of males present in the Ohio State Reformatory on Dec. 31, 1933, was 3,372, of whom 1,908 (56.6 percent) were examined. Of those examined, 78.6 percent were white and 21.4 percent were colored. The total population of 3,372 included a few above 30, those above 30 who were examined are not included in the 1,908.

THE DENTAL EXAMINATION

The items on the examination form, which will be analyzed subsequently, may be conveniently classified under two major subjects—indications for treatment, and previous treatment as observed. Under the first is included the presence or absence of the following: any indication for treatment, malocclusion (when present, classified as slight or severe),[3] prophylaxis, diseased gums, indicated fillings (including the number), and indicated extractions (including the number). In the matter of diseased gums no effort was made to differentiate between the various forms of pathology. Under the second subject, namely, previous treatment, is included the presence or absence of any observed treatment of the past, prophylaxis (history), filled teeth (including the number), and extracted teeth (including the number).

All the examinations were made by a single observer, J. D. McLeod, D. D. S., institution dentist, with the aid of a dental mouth mirror and an explorer, and with the inmate facing a good light. Pits and fissures were included as indications for fillings.

ANALYSIS OF THE DATA

Since the number of examinations as shown in table 1 is small for each single year of age for the colored and for the younger and older members of the white population, it was decided to group the single ages of each color into three 5-year age groups, namely, 16–20, 21–25, and 26–30, respectively.

Indications for dental treatment.—The number and percent of white and colored males of the three age groups with specified indications for treatment are shown in table 2. The impression gained from the table is that the white population is relatively in greater need of treatment than the colored, and that in each race the percentages increase with age, with the possible exception of those percentages associated with the malocclusions which, in general, decrease. A consideration of the observations from the point of view of the theory of sampling, however, reveals that many of the differences are more apparent than real; that is, they are not significant but are probably the result of the operation of chance.

[3] Malocclusion should not, of course, be included as an indication for treatment when dealing with an adult population. In the subsequent reports on children of school age the inclusion is justifiable. For the sake of uniformity, and because of the findings connected with malocclusion, it has been decided not to exclude the term from this paper nor from this classification.

TABLE 2.—*Number and percent of white and colored males [illegible] with specified indications for dental treatment*

Indications for dental treatment	White males				Colored males			
	All ages	16–20	21–25	26–30	All ages	16–20	21–25	26–30
Total examined	1,499	558	668	273	409	130	[illegible]	83
Any indication	1,448	534	649	265	381	115	[illegible]	80
Percent	96.6	95.7	97.2	97.1	93.2	88.5	[illegible]	96.4
Slight malocclusion	270 [4]	120	118 [3]	37 [1]	50	19	23	8
Percent	18.1	21.5	17.0	13.6	12.2	14.6	11.7	9.6
Severe malocclusion	116 [4]	45	51 [3]	20 [1]	25	12	8	5
Percent	7.8	8.1	7.7	7.4	6.1	9.2	4.1	6.0
Prophylaxis	1,346	424	580	242	328	89	166	74
Percent	88.1	76.0	86.8	88.6	80.2	68.5	84.2	89.2
Diseased gums	907 [2]	266 [1]	438	203 [1]	222	47	118	57
Percent	60.6	47.8	65.6	74.6	54.3	36.2	60.2	68.7
Fillings indicated	638 [2]	227 [1]	291 [1]	120	131	37	57	37
Percent	42.6	40.8	43.6	44.0	32.0	28.5	29.1	44.6
Number of fillings	1,214 [2]	423 [1]	581 [1]	210	211	51	91	69
Number per 100 males	81.1	75.9	87.1	76.9	51.6	39.2	46.4	83.1
Extractions indicated	381	127	177	77	94	26	44	24
Percent	25.4	22.8	26.5	28.2	23.0	20.0	22.4	28.9
Number of extractions	810	211	406	193	193	38	92	63
Number per 100 males	54.0	37.8	60.8	70.7	47.2	29.2	46.9	75.9

NOTE.—The superscripts indicate the number of persons for which the particular item is unknown.

The application of significance tests [3] with regard to color differences discloses that in the youngest age group a greater percentage of whites was found to have some indication for treatment and to have diseased gums, and that both in the youngest and middle age groups the indication for one or more fillings is greater in the white population. As regards age differences in the whites, the percentages requiring prophylaxis in the middle and oldest groups are each greater than the percentage in the youngest age group, and the percentage showing diseased gums is definitely greater in each succeeding age group. In the colored population the percentages associated with prophylaxis behave like those of the whites, and the percentages showing diseased gums in the middle and oldest groups are each greater than the percentage in the youngest group. With respect to fillings, which presented no real age differences in the whites, the percentage in the oldest group is greater than either of the percentages of the other two age groups.

In summary, it may be stated that color is of importance in the youngest and middle age groups with respect to the need for one or more fillings, and in the youngest group with respect to any indication for treatment, and diseased gums; in all of these the whites presented higher percentages. Age is of importance in both races with respect

[3] The significance of differences with regard to the number of fillings and the number of extractions indicated (table 2), and the number of filled teeth and the number of extractions observed (table 4), will be examined in the discussions of tables 3 and 5, respectively.

[illegible] and diseased gums, and only in the colored with [illegible]; all of these showed higher percentages in the oldest group than in the youngest. All other differences with respect to color or age not specifically referred to were found to be nonsignificant.

Number of indicated fillings, and of extractions, per person.—Table 3 shows the white and colored populations of the three age groups classified according to the number of indicated fillings and extractions, respectively, per person. The table reveals that the whites of all three age groups have a smaller percentage of persons than the colored of the corresponding age groups with no indications for fillings or for extractions, and that in each race these percentages decrease with age. It is observed further that, in general, the various distributions (1–32) behave similarly in that the first term of each is relatively high and the successive terms decrease in magnitude as the number of fillings or extractions indicated increases.

TABLE 3.—*Distribution of white and colored males of different age groups according to the frequency of (a) fillings and (b) extractions indicated*

Number of fillings and extractions indicated per person	White males								Colored males							
	All ages		16–20		21–25		26–30		All ages		16–20		21–25		26–30	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total examined	1,499	100.0	558	100.0	668	100.0	273	100.0	409	100.0	130	100.0	196	100.0	83	100.0
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(a) Fillings:																
None	859	57.4	330	59.2	376	56.4	153	56.0	278	68.0	93	71.5	139	70.9	46	55.4
1	341	22.8	128	23.0	152	22.8	61	22.4	76	18.6	26	20.0	31	15.8	19	22.9
2	158	10.6	52	9.3	68	10.2	38	13.9	41	10.0	10	7.7	20	10.2	11	13.3
3	74	4.9	22	4.0	39	5.8	13	4.8	6	1.5	0	0	5	2.6	1	1.2
4	32	2.1	14	2.5	12	1.8	6	2.2	5	1.2	0	0	0	0	5	6.0
5 and over	33	2.2	11	2.0	20	3.0	2	7	3	7	1	8	1	.5	1	1.2
Unknown	2	---	1	---	1	---	0	---	0	---	0	-----	0	----	0	-----
	(17)	(18	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
(b) Extractions:																
None	1,118	74.6	431	77.3	491	73.5	196	71.8	315	77.0	104	80.0	152	77.6	59	71.1
1	226	15.1	85	15.2	103	15.4	38	13.9	51	12.5	15	11.5	26	13.3	10	12.1
2	74	4.9	27	4.9	30	4.5	17	6.2	21	5.1	10	7.7	5	2.5	6	7.2
3	27	1.8	4	7	15	2.3	8	3.0	9	2.2	1	8	5	2.5	3	3.6
4	15	1.0	3	5	8	1.2	4	1.5	3	7	0	0	3	1.6	0	0
5 and over	39	2.6	8	1.4	21	3.1	10	3.6	10	2.5	0	0	5	2.5	5	6.0

Probabilities have been calculated to answer the question of whether the distributions are significantly different with respect to color and age. While real differences were found as regards the presence of one or more indications for fillings between the races and within the colored population (see discussion of table 2), it is probable, considering the distribution of the calculated probabilities themselves, that the various pairs of distributions given in the table are not significantly different. It may be said, accordingly, that no matter what

the color or what the age within the limits included in the survey, the frequency of indicated fillings or of indicated extractions varies but little.

Previous dental treatment as observed.—The number and percent of white and colored males of the three age groups with specified previous dental treatment are shown in table 4. An examination of this table indicates that the white population was observed to have received relatively more treatment than the colored, and that, in general, the treatment received by both races increases with age. All of the differences between the corresponding age groups of the two races are real, with the exception of the difference associated with observed extracted teeth in the oldest age group. With the exception noted, therefore, there is a race difference with respect to past treatment, the white population having received relatively more treatment than the colored.

TABLE 4.—*Number and percent of white and colored males of different age groups with specified previous dental treatment*

Previous dental treatment	White males				Colored males			
	All ages	16–20	21–25	26–30	All ages	16–20	21–25	26–30
Total examined	1,499	558	668	273	409	130	196	83
Any treatment	1,435 [1]	524 [3]	648 [4]	263 [3]	364 [3]	115	176 [3]	73
Percent	96 2	94.2	97 6	97 0	89 7	88 5	91 2	88 0
Prophylaxis	1,365 [6]	504 [3]	610 [4]	251 [3]	331 [3]	104	156 [3]	69
Percent	91 5	90 6	91 9	92.6	81 5	80 0	81 9	83 1
Teeth filled	808 [7]	273 [3]	378 [3]	157 [3]	108 [3]	38	44 [3]	26 [1]
Percent	54 2	49 1	56 8	57 9	26 6	29 2	22.7	31 7
Number of teeth filled	2,730 [10]	901 [4]	1,255 [4]	574 [3]	227 [4]	102	73 [3]	52 [1]
Number per 100 males	183 3	162 6	189 0	211 8	56.0	78 5	37 8	63 4
Extracted teeth	1,165 [3]	388 [2]	542 [1]	235	269 [3]	72	130 [2]	67
Percent	77 9	69 8	81 3	86 1	66.1	55 4	67 0	80 7
Number of extracted teeth	4,659 [5]	1,152 [3]	2,097 [2]	1,410	797 [4]	159 [1]	351 [2]	287 [1]
Number per 100 males	311 8	207 6	314.9	516 5	196 8	123 3	180 9	350 0

NOTE.—The superscripts indicate the number of persons for which the particular item is unknown.

On the other hand, the increases in the percentages with age in each race are more apparent than real. Only in the matter of extracted teeth are the differences probably real; in the white as well as in the colored population the oldest age group shows a higher percentage with one or more extracted teeth than either the middle or youngest group. As regards previous treatment, therefore, race is of more importance than increasing age; with regard to indications for treatment (table 2), contrariwise, increasing age is of more importance than race. Further comparison discloses the fact that, while the white population had received relatively more treatment than the colored, it continued, in general, to be in need of more treatment.

Number of observed filled teeth, and of extracted teeth, per person.—Table 5 shows the white and colored males of the three age-groups

classified according to the number of teeth that had been filled and extracted, respectively, per person. The table indicates, in general, that the whites have smaller percentages of persons than the colored with no teeth filled or no teeth extracted, and that in each race these percentages decrease with age. As in table 3 (indications), but not so uniformly, the 32 distributions behave similarly beginning with a term that is relatively high and with the successive terms decreasing in magnitude, with a few exceptions, as the frequency of filled teeth or extractions increases. Otherwise the two tables contrast remarkably. It was observed above that the distributions of the frequency of indicated fillings and extractions (table 3) probably present no differences with respect to color or age. Table 5, on the other hand, presents both color and age differences.

TABLE 5.—*Distribution of white and colored males of different age groups according to the frequency of (a) teeth filled and (b) extracted teeth*

Number of teeth filled and extracted teeth per person	White males								Colored males							
	All ages		16-20		21-25		26-30		All ages		16-20		21-25		26-30	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total examined	1,499	100.0	558	100.0	668	100.0	273	100.0	409	100.0	130	100.0	196	100.0	83	100.0
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(a) Teeth filled:																
*None	684	45.9	283	51.1	287	43.2	114	42.1	298	73.6	92	70.7	150	77.7	56	68.3
1	232	15.6	79	14.2	110	16.6	43	15.9	56	13.8	15	11.5	29	15.0	12	14.6
2	173	11.6	63	11.4	82	12.4	28	10.3	25	6.2	9	6.9	8	4.2	8	9.8
3	114	7.7	37	6.7	52	7 8	25	9.2	10	2 5	4	3 2	2	1.1	4	4.9
4	91	6.1	32	5.8	42	6.3	17	6.3	7	1.7	0	4.5	1	.5	0	0
5 and over	195	13.1	60	10.8	91	13.7	44	16.2	9	2.2	4	3.2	3	1.5	2	2.4
Unknown	10	----	4	----	4	----	2	----	4	----	0	----	3	----	1	----
	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
(b) Extracted teeth:																
None	331	22 1	168	30.3	125	18.8	38	13.9	138	34.1	58	45 0	64	33 0	16	19.5
1	240	16.1	107	19.3	110	16.5	23	8.4	76	18 8	27	20.9	37	19.0	12	14.6
2	245	16.4	97	17.5	118	17.0	35	12.8	72	17.8	25	19 4	38	19.6	9	11.0
3	172	11.5	59	10.6	91	13.7	22	8.1	38	9.4	7	5.4	22	11.3	9	11.0
4	154	10.3	57	10.3	68	10 2	29	10.6	35	8.6	7	5.4	15	7.7	13	15.9
5	104	7.0	26	4.7	50	7.5	28	10.3	16	3.9	3	2.3	8	4.1	5	6.1
6	67	4.5	15	2.7	31	4.6	21	7.7	10	2.5	0	0	3	1.6	7	8.5
7	48	3.2	8	1.4	20	3.0	20	7.3	4	1.0	0	0	3	1.6	1	1.2
8	34	2.3	5	.9	20	3.0	9	3.3	5	1.2	1	.8	3	1.6	1	1.2
9 and over	99	6.6	13	2.3	38	5.7	48	17.6	11	2.7	1	.8	1	.5	9	11.0
Unknown	5	----	3	----	2	----	0	----	4	----	1	----	2	----	1	----

* The percents in this line when subtracted from 100.0 g[illegible] the differences do not agree with those recorded in table 4, it is because some of the examinations r[illegible] the presence only of filled teeth and not the specific number. The same explanation applies to e[illegible] teeth.

With respect to the distribution of the number of filled teeth per person, each age group of the white population presents a greater percentage of persons than the corresponding age group of the colored population with the higher frequencies. No real differences were found within the races as regards age.

Regarding the number of extracted teeth, the youngest and middle age groups of the whites show a larger percentage with higher frequencies than the corresponding age groups of the colored. Both races show real age increases; the percentages associated with the higher frequencies of extracted teeth in the whites increase with age, and in the colored population there is an increase in passing from the youngest and middle age groups to the oldest group.

In summary, it may be stated, in general, that the white population had received individually more treatment than the colored with respect to either filled teeth or extractions, and that in each population the number of extractions increased with age. It is of interest to note here that in spite of the fact that the whites had received more treatment with respect to either filled teeth or extractions, the needs (table 3) as regards the frequency of fillings or extractions vary but little as between the races.

Relation of indicated treatment to past treatment.—The indicated treatment associated with a particular individual may be quantitatively expressed by a single number which is the sum of the number of indicated fillings and the number of indicated extractions as observed in that individual; similarly, past treatment may be represented by a number which is the sum of the number of teeth filled and the number extracted. It has been shown how the 4 components of these 2 sums or indexes behave separately (tables 3 and 5). The behavior of the two indexes individually was also studied with respect to color and age with the aid of tables similar to tables 3 and 5; and since no additional information was elicited, the tables are not included here and no further reference will be made to them.

The question of the relationship between the 2 defined indexes now logically arises; this relationship was studied, in particular, as regards each of the 3 age groups specific for race. Six correlation tables were accordingly made showing for every possible pair of indexes the number of persons associated with each. In the study of such relationships two obvious facts must be borne in mind. These are, first, a certain proportion of individuals has teeth that are inherently immune from caries, and this immunity increases, more or less, with the passage of time; and, second, there is a certain proportion whose teeth are susceptible to caries to such a degree that the number of past treatments may not influence the number of indications for treatment.

Since none of the correlation tables shows an orderliness sufficient to express the relationship between the indexes by means of a mathematical formula, none of the tables is presented. However, it is of no little interest to note that while no functional relationship could be discovered, the tables indicate for the three age groups of each race that persons who have had no past treatment are more likely than not to require no treatment, and that as the frequency of past treatments

increases there is a definite suggestion that the frequency of indications for treatment decreases. The latter is more evident in the white population than in the colored, probably because of the larger number of persons forming the white group and the small number of colored persons with much past treatment.

Indicated treatments plus past treatments per person.—Thus far the following four observations have been examined with respect to their frequency: Indicated fillings, indicated extractions, filled teeth, and extracted teeth. These were considered separately, in the form of two summed pairs or indexes, and, finally, the two indexes themselves were compared. The need for a consideration of what may be termed total caries now arises. This requires the adoption of a procedure which eliminates the effects of the activities connected with the presence of dental facilities. Accordingly, a numerical sum, or an index representing both untreated and treated caries, was formed by adding together for each individual examined the number of his indicated fillings, indicated extractions, filled teeth, and extracted teeth. The result of this procedure is given in table 6 for the white and colored males of the three age groups. The percentages are also shown graphically by means of bar diagrams in figure 1.

TABLE 6.—*Distribution of white and colored males of different age groups according to the frequency of untreated and treated caries (fillings indicated plus number of extractions indicated plus number of teeth filled plus number of extracted teeth)*

Untreated plus treated caries per person	White males								Colored males							
	All ages		16-20		21-25		26-30		All ages		16-20		21-25		26-30	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total examined	1,499	100.0	558	100.0	668	100.0	273	100.0	409	100.0	130	100.0	196	100.0	83	100.0
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
None	139	9.4	77	14.0	45	6.8	17	6.3	91	22.6	29	22.5	50	25.9	12	14.8
1	108	7.3	46	8.3	49	7.4	13	4.8	56	13.9	23	17.8	24	12.4	9	11.1
2	130	8.7	62	11.2	50	7.6	18	6.6	56	13.9	25	19.4	27	14.0	4	5.0
3	122	8.2	54	9.8	53	8.0	15	5.6	41	10.1	15	11.6	22	11.4	4	5.0
4	153	10.3	71	12.9	72	10.9	10	3.7	33	8.2	11	8.5	16	8.3	6	7.4
5	134	9.0	47	8.5	67	10.1	20	7.4	23	5.7	4	3.1	12	6.2	7	8.7
6	114	7.7	39	7.1	57	8.6	18	6.6	35	8.7	9	7.0	17	8.8	9	11.1
7	85	5.7	35	6.3	40	6.0	10	3.7	21	5.2	7	5.4	8	4.2	6	7.4
8	79	5.3	24	4.3	43	6.5	12	4.4	12	3.0	2	1.6	6	3.1	4	5.0
9	89	6.0	20	3.6	36	5.4	33	12.2	8	2.0	1	.8	2	1.0	5	6.2
10	56	3.8	22	4.0	21	3.2	13	4.8	9	2.2	1	.8	3	1.6	5	6.2
11	54	3.6	11	2.0	23	3.5	20	7.4	3	.7	0	0	3	1.6	0	0
12	46	3.1	12	2.2	24	3.6	10	3.7	3	.7	0	0	2	1.0	1	1.2
13	44	3.0	7	1.3	25	3.8	12	4.4	5	1.2	1	.8	1	.5	3	3.7
14	34	2.3	7	1.3	15	2.3	12	4.4	2	.5	0	0	0	0	2	2.4
15	18	1.2	8	1.4	5	.7	5	1.9	0	0	0	0	0	0	0	0
16	19	1.3	0	0	12	1.8	7	2.6	1	.3	0	0	0	0	1	1.2
17	16	1.1	5	.9	5	.7	6	2.2	1	.3	1	.8	0	0	0	0
18	10	.7	3	.5	4	.6	3	1.1	0	0	0	0	0	0	0	0
19	5	.3	0	0	2	.3	3	1.1	2	.5	0	0	0	0	2	2.4
20 and over	30	2.0	2	.4	14	2.2	14	5.1	1	.3	0	0	0	0	1	1.2
Unknown	14	-----	6	-----	6	-----	2	-----	6	-----	1	-----	3	-----	2	-----

Consider table 6. Probability tests have been applied to ascertain whether the differences are significant between the corresponding age groups of the two races, and between the age groups within each race,

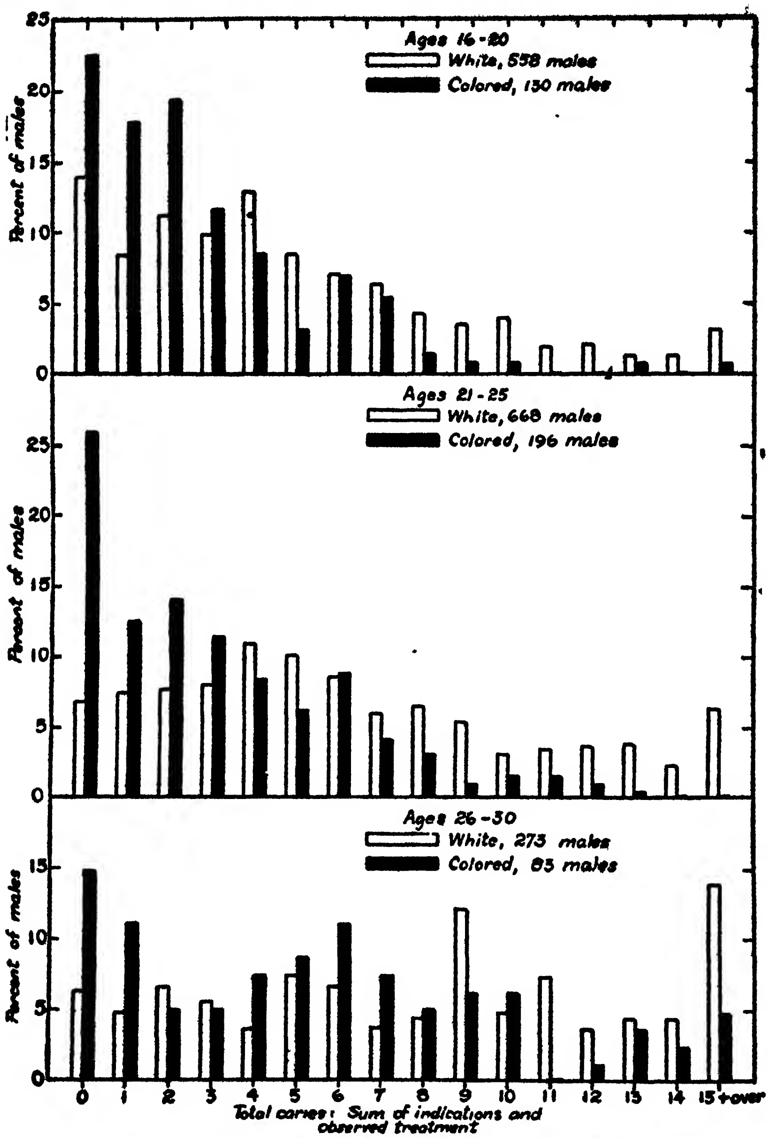

FIGURE 1.—Distribution of white and colored males of three different age groups according to the frequency of untreated and treated caries (number of fillings indicated plus number of extractions indicated plus number of teeth filled plus number of extracted teeth).

with respect to a total caries index of size zero and each of the distributions (1–16) taken as a whole. The percentages of the white males in the 3 age groups with no observed untreated or treated caries

are 14, 7, and 6, respectively; for the colored the corresponding percentages are 23, 26, and 15. The first series of percentages is significantly different from the second, and in the first series the percentage associated with the youngest group is greater than the percentages associated with the middle and oldest groups; no age differences could be found in the colored population. Stated in other words, the white population shows definitely fewer individuals per hundred with no caries than the colored, and this is true for all age groups; in the white population, furthermore, the percentage with no caries decreases in passing from the youngest to either the middle or oldest group, while in the colored population changes in age appear to have no effect on the percentage of individuals without caries.

An examination of the various distributions of table 6 reveals that of the 9 possible comparisons, 3 between the races and 3 within each of the races, 7 present significant differences—the youngest and middle age groups with respect to color, the 3 age groups of the white population with respect to each other, and in the colored population the distribution of the oldest age group is different from either the middle or the youngest group. It follows, therefore, that there is a color difference with respect to the youngest and middle age groups, the whites showing a larger percentage of persons with the higher caries totals than the colored, that in the white population the percentage with the higher caries totals increases with age, and finally, in the colored population the oldest age group presents larger percentages with the higher caries totals than either the middle or youngest group.

The findings of this section may be recapitulated, thus: Color and increasing age are important factors in the incidence of caries, the whites being attacked with greater frequency than the colored, and the percentages with the higher frequencies increasing with age in both races.

SUMMARY

The results of the dental examination of 1,908 inmates of the Ohio State Reformatory at Mansfield are reported. The number examined represents 57 percent of the total inmate population. Of those examined, 79 percent are white and 21 percent colored. For the purposes of analysis the races were held separate and divided into 3 age groups, namely, 16–20, 21–25, and 26–30, respectively.

Since the various percentages, and the conclusions derived from them with respect to color and age, are based on data from a unique population, the reader is cautioned not to apply the findings of this paper to white and colored populations in general.

The analysis permits it to be stated, in general, that while the white population had received relatively more dental treatment than the

colored, it continued to be in need of more treatment. The particulars may be briefly summarized as follows:

1. *Indications for dental treatment.*—The white population presented larger percentages than the colored as regards indications for treatment in general, diseased gums, and indications for one or more fillings. Indications for prophylaxis and for one or more extractions and malocclusion showed no race differences. The percentages associated with prophylaxis and diseased gums increased with age in both races.

2. *Number of fillings and number of extractions indicated, per person.*—No differences were found with respect to the frequency of indicated fillings or of indicated extractions with regard to either race or age.

3. *Previous dental treatment.*—The white population presented larger percentages than the colored as regards previous treatment in general, prophylaxis, one or more filled teeth, and one or more extracted teeth. Only in the matter of extracted teeth were the percentages found to increase with age, and this was true for both races.

4. *Number of teeth filled and number of extracted teeth, per person.*—With respect to the higher frequencies of filled teeth and of extracted teeth, the white population showed larger percentages than the colored, the percentages with the higher frequencies of extracted teeth increasing with age in both races.

5. *Relation of indicated treatment (number of fillings plus number of extractions) to past treatment (number of teeth filled plus number extracted).*—In both races and for each age group it was clearly evident that persons who had had no treatment were more likely than not to require no treatment, and that as the treatments performed increased in number there was a definite suggestion that the number of indications for treatment decreased.

6. *Total caries (indicated treatment plus past treatment) per person.*—The white population gave evidence of being attacked with greater frequency by caries than the colored, and the percentages with the higher frequencies increased with age in both races.

ACKNOWLEDGMENTS

We are indebted to Dr. J. D. McLeod, institution dentist, for performing the dental examinations and for supplying information concerning their conduct. Thanks are expressed to Director John McSweeney, of the Department of Public Welfare of Ohio, and to Superintendent T. C. Jenkins, of the Ohio State Reformatory, for furnishing details relating to the reformatory and its inmates.

REFERENCE

(1) Jenkins, T. C.: The Ohio State Reformatory. In Ninth Annual Report of the Department of Public Welfare, State of Ohio, for the fiscal year ending December 31, 1930. N. p., n. d. Pp. 588–601.

SUSCEPTIBILITY OF THE OPOSSUM (*Didelphis virginiana*) TO THE VIRUS OF ENDEMIC TYPHUS FEVER [1]

By GEORGE D. BRIGHAM, Ph. D., *Senior Medical Technician, United States Public Health Service*

Numerous animals have been reported as susceptible to the virus of endemic typhus fever, and to this list is now to be added the opossum.

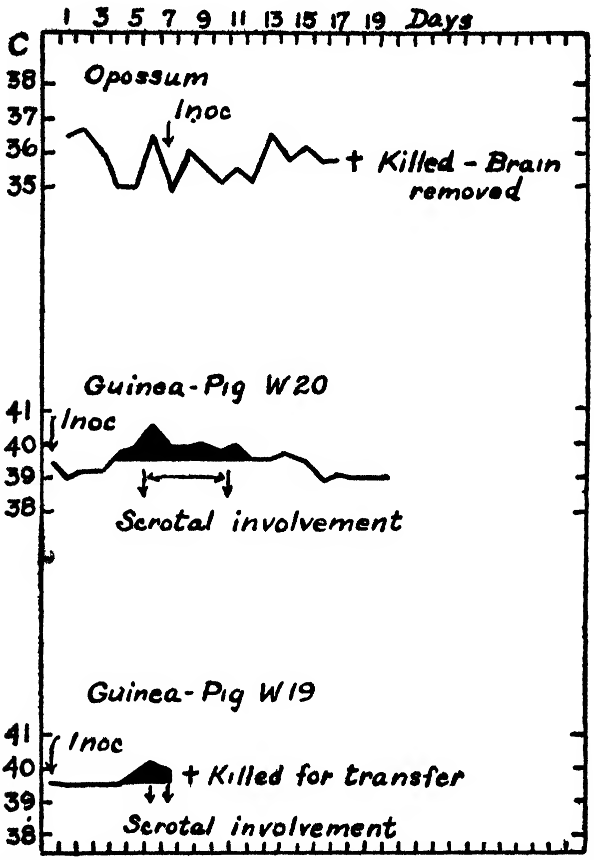

FIGURE 1.—Temperature records of the opossum and the guinea pigs receiving the same inoculum. The shaded areas denote fever. The duration of the scrotal involvement is also shown.

The Wilmington strain of endemic typhus was used in this study as the stock strain. This strain and the experimental strain were propagated by transferring, under the usual aseptic conditions, heart blood and testicular washings from an infected pig which had a typical clinical picture to fresh normal guinea pigs. Blood cultures were

[1] Contribution from the Typhus Research Laboratory of the United States Public Health Service at Mobile, Ala.

made at each transfer in dextrose broth with aerobic and anaerobic conditions fulfilled.

The opossum, a female weighing 1,930 grams, used in this study was trapped about 15 miles north of Mobile, Ala. The temperature of the animal was recorded for 7 days before it was inoculated and thereafter until it was killed. The opossum was inoculated with 6 cc of testicular washings of a typhus-infected guinea pig killed on the 3d day of its fever and the 2d day of scrotal involvement.

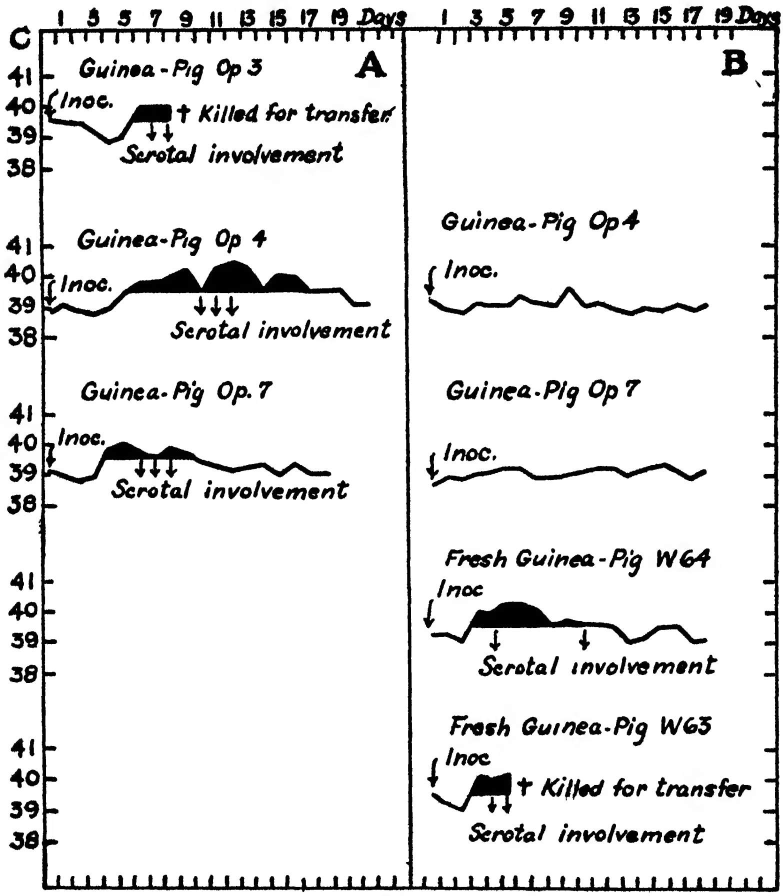

FIGURE 2.—Daily temperature records of (A) guinea pigs 3 and 4, inoculated with emulsified brain material of the opossum, and guinea pig 7, of the next generation, (B) cross immunity test, guinea pigs inoculated with the stock virus, the Wilmington strain

Figure 1 shows the temperature record of the opossum and of the two guinea pigs which received the same material as the opossum. The virus apparently caused no elevation of temperature in the opossum. Other opossums, both male and female, likewise showed no rise in temperature in similar experiments.

Ten days after inoculation the oposeum was killed, and the brain was removed and emulsified with 20 cc of saline. Each of two normal guinea pigs was injected intraperitoneally with 4 cc of this material, which produced a typical mild protein shock that subsided within

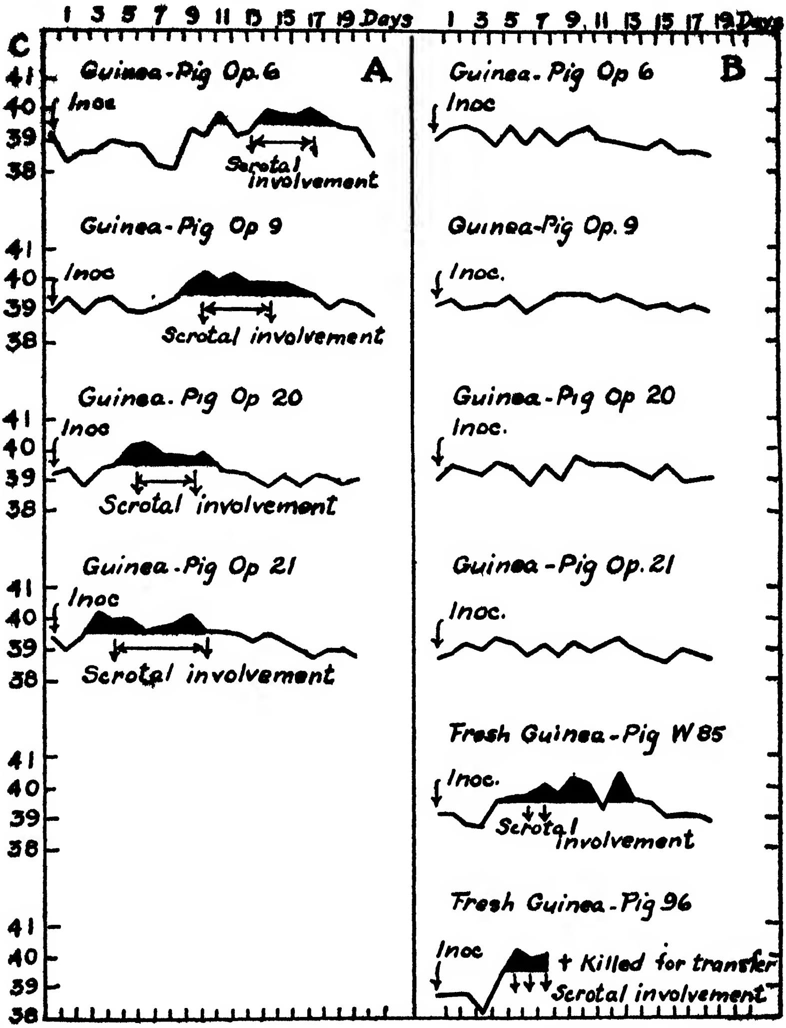

FIGURE 3.—Cross immunity test: Daily temperature records of (A) guinea pigs inoculated with virus recovered from opossum; (B) guinea pigs inoculated with stock virus, the Wilmington strain.

the hour. On gross post-mortem examination all the organs of the opossum were apparently normal.

Figure 2 shows the temperature record of the guinea pigs receiving the emulsified brain material of the opossum, the pig of the next generation, and the cross-immunity tests with the Wilmington strain.

The strain recovered from the brain of the opossum was passed through 20 generations, in each of which 2 guinea pigs received 5 cc each of heart blood and 2 pigs 3 or 4 cc of testicular washings each. All the pigs showed typical temperature rise and scrotal involvement. Routine blood cultures made at the time of the transfers were uniformly negative.

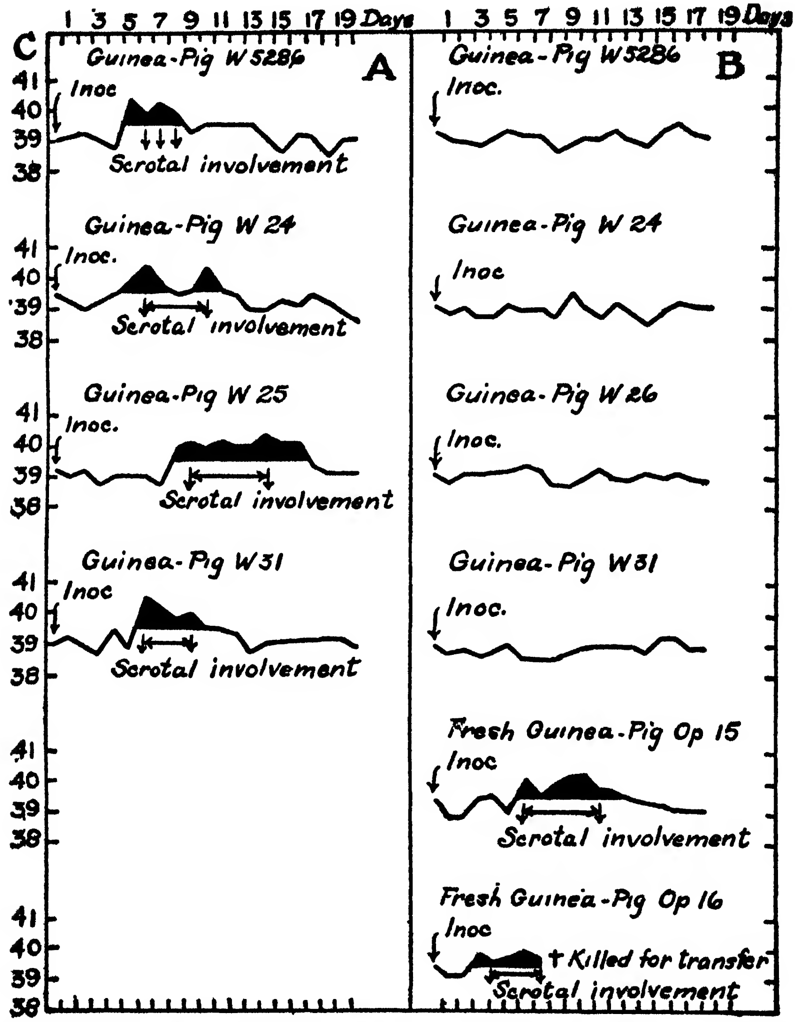

FIGURE 4.—Cross immunity test. Daily temperature records of (A) guinea pigs inoculated with stock virus, the Wilmington strain, (B) guinea pigs inoculated with virus recovered from opossum.

Cross-immunity was found to be complete between the opossum and the Wilmington strains of endemic typhus virus. Figures 3 and 4 illustrate this cross immunity.

On histological examination by Surgeon Lillie, at the National Institute of Health, 8 out of 10 brains from guinea pigs of the second, third, fourth, and sixth generations were found to have the characteristic lesions of typhus fever.

Rabbits were inoculated with the strain of virus recovered from the opossum, and their blood was tested at weekly intervals for the presence of *Proteus* X 19, type O agglutinins.[2] Table 1 shows the agglutination titer produced in the rabbits.

The results reported here indicate that the opossum is susceptible to the virus of endemic typhus fever.

TABLE I.—*The production of agglutinins for Proteus X 19 (type O) in serums of rabbits following inoculation with endemic typhus virus recovered from the opossum*

Animal	Weeks after inoculation	Dilution of serum [1]				
		40	80	160	320	640
Rabbit no. 2	0	0	0	0	0	0
	1	4	2	0	0	0
	2	3	2	0	0	0
	3	2	1	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0
Rabbit no. 4	0	0	0	0	0	0
	1	1	0	0	0	0
	2	4	4	2	0	0
	3	2	1	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0
Rabbit no. 6	0	0	0	0	0	0
	1	1	0	0	0	0
	2	4	3	2	1	0
	3	3	2	0	0	0
	4	2	1	0	0	0
	5	1	0	0	0	0

[1] Agglutination is graded as follows: 1, trace; 2, partial, 3, incomplete: 4, complete.

A STRAIN OF ENDEMIC TYPHUS FEVER ISOLATED FROM THE BRAIN OF A WILD RAT[1]

By GEORGE D. BRIGHAM, Ph.D., *Senior Medical Technician, United States Public Health Service*

In connection with measures instituted to control endemic typhus fever in Alabama, attempts were made to isolate strains of the virus from wild rats trapped at typhus foci, as had been done in Mexico, various places in Europe, and in Savannah, Ga.

In the fall of 1934, in Montgomery, Ala., a case of typhus fever occurred among the personnel of a small grocery store. Two other cases had occurred previously in the neighborhood of this same store. Inspection of the grocery premises showed evidences of rat infestation. Trapping was begun and several specimens of *Rattus norvegicus*

[1] The work reported here was done with the aid of a grant from the Rockefeller Foundation and the assistance of the Health Department of the State of Alabama. The final steps were carried out at the National Institute of Health.

[2] The writer wishes to express his thanks to Mr. C. H. Waite, of the Alabama State Board of Health, for performing the agglutination tests.

were secured. Two of the rats were secured alive and brought to the laboratory and chloroformed, and the fleas were removed. All of the fleas were identified as *Xenopsylla cheopis*. Brains of these two rats were removed under aseptic conditions, both emulsified in the same sterile mortar with 10 cc of sterile saline. Four cc of this material was injected intraperitoneally into a guinea pig. The fleas from these two rats were also pooled and injected into a second guinea pig. The flea-injected guinea pig failed to produce any significant reaction and was discarded. The temperature of the guinea pig receiving the brain material rose to 40.5° C. on the 6th day after inoculation, and continued for 2 days, when scrotal involvement was noted. Transfers of heart blood from this guinea pig were made to two fresh guinea pigs, a white rat, and a rabbit. The testicular washings were also injected into two fresh guinea pigs and a white rat. A blood culture of the killed guinea pig and the cultures made at each subsequent transfer were negative.

The strain was subsequently carried in like manner through guinea pigs for three generations, when it died out in guinea pigs during the illness of one of the laboratory workers with typhus. The strain was later recovered from the brain of the white rat killed 23 days after it had been inoculated with testicular washings from the original guinea pig. The strain was then carried through five transfer generations in guinea pigs, after which it was sent to Surg. R. E. Dyer, at the National Institute of Health, for confirmation.

The majority of the guinea pigs inoculated in Montgomery, Ala., showed typical pictures of clinical typhus, and two rabbits developed agglutinins for *Proteus* X 19, following inoculation with this virus.

At the National Institute of Health the strain was carried through 9 guinea pig generations, 92 guinea pigs being used; 72 of these animals developed clinical endemic typhus with typical scrotal reactions, 18 developed fever alone, and 2 showed no evidence of infection. Rickettsiae were readily found in smears made from the tunica vaginalis of guinea pigs inoculated with this strain, and cross immunity was found to be complete between this strain and known endemic typhus (Wilmington strain) and known epidemic typhus (Breinl strain). Sections were made from the brains of nine guinea pigs from this strain and examined by Surg. R. D. Lillie. Sections from 6 guinea pigs showed characteristic typhus lesions, while the remaining 3 were reported as inconclusive.

SUMMARY

A strain of endemic typhus virus was isolated from the brain of a wild rat trapped at a typhus focus in Montgomery, Alabama.

(Acknowledgment is made to Passed Asst. Surg. R. E. Butler, United States Public Health Service, for his aid in this work.)

DEATHS DURING WEEK ENDED MARCH 7, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar. 7, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	10,136	9,074
Deaths per 1,000 population, annual basis	14.2	12.6
Deaths under 1 year of age	600	657
Deaths under 1 year of age per 1,000 estimated live births	54	60
Deaths per 1,000 population, annual basis, first 10 weeks of year	13.7	12.9
Data from industrial insurance companies.		
Policies in force	68,069,308	67,519,370
Number of death claims	14,637	15,131
Death claims per 1,000 policies in force, annual rate	11.2	11.7
Death claims per 1,000 policies, first 10 weeks of year, annual rate	10.8	10.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Mar. 14, 1936, and Mar. 16, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 14, 1936, and Mar. 16, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. [illegible] 1935
New England States:								
Maine	3	1	8	15	238		1	0
New Hampshire	1				34	14	0	0
Vermont					502	1	0	0
Massachusetts	3	4			986	338	8	2
Rhode Island		2	4		82	64	1	0
Connecticut	2		25	9	88	878	2	0
Middle Atlantic States:								
New York	38	25	[1] 66	[1] 12	2,444	2,627	28	17
New Jersey	16	20	97	25	226	1,106	9	2
Pennsylvania	40	51			865	5,234	17	3
East North Central States:								
Ohio	26	60	130	149	389	1,148	13	13
Indiana	19	11	36	20	14	453	2	0
Illinois	35	61	31	70	52	3,202	19	25
Michigan	4	15	5	5	80	3,447	0	1
Wisconsin	2	6	67	77	109	2,068	1	5
West North Central States:								
Minnesota	4	1			384	1,599	3	3
Iowa	14	10	7	46	4	1,305	5	0
Missouri	16	29	837	172	13	892	10	18
North Dakota		2	4	3	1	170	0	0
South Dakota	4	8			5	56	0	0
Nebraska	9	5	12		25	660	2	4
Kansas	13	7	172	14		1,379	3	3
South Atlantic States:								
Delaware					61	8	0	0
Maryland [3]	2	4	74	34	199	59	13	5
District of Columbia	25	6	3	2	63	49	2	9
Virginia	16	26	2,230		220	1,081	33	6
West Virginia	13	19	192	254	15	506	7	8
North Carolina	9	15	365	55	85	699	4	2
South Carolina [3]	5	2	873	334	37	46	13	1
Georgia [3]	9	11	1,058	225			15	0
Florida	12	4	27	29	4	100	3	1
East South Central States:								
Kentucky	17	10	93	78	190	605	40	2
Tennessee	17	15	416	226	170	115	11	5
Alabama [3]	17	10	2,224	308	22	373	2	2
Mississippi [3]	9	1					3	1

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 14, 1936, and Mar. 16, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935
West South Central States:								
Arkansas	8	3	383	106	13	37	3	0
Louisiana	16	26	111	18	68	241	0	0
Oklahoma [4]	8	4	343	198	3	278	5	5
Texas [3]	44	46	880	737	475	155	11	4
Mountain States:								
Montana	6	8	32	145	13	273	0	1
Idaho			6		8	70	0	0
Wyoming	4	1			4	100	1	0
Colorado	3				23	893	2	0
New Mexico	5	7	21	26	32	35	2	3
Arizona	6	1	316	53	57	38	1	2
Utah [3]					5	10	1	0
Pacific States:								
Washington	1	4	5	1	257	221	6	0
Oregon			218	83	385	168	1	2
California	35	38	1,022	215	2,676	885	9	4
Total	536	579	12,393	3,744	11,626	83,695	312	159
First 11 weeks of year	7,002	8,195	76,150	86,302	80,967	242,912	2,343	1,320

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar 14, 1936	Week ended Mar 16, 1935	Week ended Mar 14, 1936	Week ended Mar 16, 1935	Week ended Mar 14, 1936	Week ended Mar 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935
New England States:								
Maine	0	0	12	15	0	0	0	2
New Hampshire	1	0	11	20	0	0	0	0
Vermont	0	0	20	20	0	0	0	0
Massachusetts	0	0	301	277	0	0	2	1
Rhode Island	0	0	28	22	0	0	0	0
Connecticut	1	0	150	95	0	0	1	0
Middle Atlantic States:								
New York	3	0	1,326	1,102	0	0	16	7
New Jersey	0	0	653	190	0	0	1	5
Pennsylvania	1	0	533	643	0	0	6	5
East North Central States:								
Ohio	0	0	445	1,034	0	0	2	1
Indiana	0	0	286	212	4	0	1	0
Illinois	3	1	882	1,227	13	1	8	12
Michigan	3	0	384	427	2	0	3	0
Wisconsin	0	2	584	523	15	26	0	1
West North Central States:								
Minnesota	0	1	435	187	1	13	1	0
Iowa	0	0	233	83	11	0	1	1
Missouri	1	1	216	87	8	4	1	1
North Dakota	0	0	66	105	2	0	0	1
South Dakota	0	0	73	10	35	0	0	0
Nebraska	1	1	189	57	32	41	0	1
Kansas	1	0	347	84	79	8	1	0
South Atlantic States:								
Delaware	0	0	4	27	0	0	0	0
Maryland [3]	0	0	87	95	0	0	1	0
District of Columbia	0	1	24	100	0	0	0	0
Virginia	0	0	57	85	0	0	5	3
West Virginia	0	0	75	126	0	0	1	3
North Carolina	0	1	45	83	0	0	4	0
South Carolina [3]	2	0	1	4	4	0	0	0
Georgia [3]	0	0	34	89	0	2	0	0
Florida	0	0	10	9	0	0	0	6

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 14, 1936, and Mar. 16, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935	Week ended Mar. 14, 1936	Week ended Mar. 16, 1935
East South Central States:								
Kentucky	0	1	50	24	0	0	2	3
Tennessee	0	0	50	33	0	0	3	2
Alabama [3]	1	0	17	13	0	2	0	1
Mississippi [2]	0	0	16	6	0	1	3	2
West South Central States:								
Arkansas	1	0	15	6	2	1	2	0
Louisiana	0	1	14	30	7	1	9	8
Oklahoma [4]	0	0	25	18	1	0	2	2
Texas [3]	2	1	94	84	5	7	3	12
Mountain States:								
Montana	0	0	175	11	9	0	1	0
Idaho	0	0	38	5	3	0	1	0
Wyoming	0	0	159	8	0	7	0	0
Colorado	0	0	158	307	6	6	0	1
New Mexico	0	0	74	7	0	4	2	2
Arizona	0	0	20	24	1	1	1	0
Utah [2]	0	0	102	94	1	7	0	0
Pacific States:								
Washington	1	0	85	52	41	25	2	2
Oregon	0	1	25	66	1	4	0	3
California	4	9	390	269	0	8	5	4
Total	26	21	9,018	7,966	283	169	91	92
First 11 weeks of year	230	294	84,058	75,781	2,513	2,113	1,136	1,438

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended March 14, 1936, 11 cases, as follows: South Carolina, 2; Georgia, 6; Alabama, 1; Texas, 2.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
December 1935										
Puerto Rico		75	37	1,370	23	3	0		0	25
February 1936										
Florida	4	23	106	104	12	1	0	22	0	10
Michigan	12	34	25	1	170		2	1,215	7	9
Nebraska	9	22	5		151		0	899	183	3
New Mexico	1	27	83		37	5	0	295	0	9
Ohio	35	135	323		965		2	1,660	2	12
Pennsylvania	22	168			2,145		4	1,982	0	18
Wyoming		10			19		0	561	22	0

December 1935

Puerto Rico: Cases
- Chicken pox: 3
- Dysentery: 12
- Filariasis: 1
- Leprosy: 1
- Mumps: 37
- Ophthalmia neonatorum: 7
- Puerperal septicemia: 3
- Tetanus: 6
- Tetanus, infantile: 3
- Trachoma: 1
- Whooping cough: 62

February 1936

Anthrax:
- Pennsylvania: 2

Chicken pox:
- Florida: 100
- Michigan: 1,702
- Nebraska: 260
- New Mexico: 138
- Ohio: 1,582
- Pennsylvania: 3,585
- Wyoming: 35

Diarrhea and enteritis:
- Ohio (under 2 years): 12

Dysentery:
- Florida: 2
- Michigan (bacillary): 3
- Ohio (amoebic): 1

February 1936—Continued

Epidemic encephalitis: Cases
- Michigan: 2
- Ohio: 2
- Pennsylvania: 2

Food poisoning:
- New Mexico: 1

German measles:
- Michigan: 136
- New Mexico: 18
- Ohio: 90
- Pennsylvania: 981

Impetigo contagiosa:
- Michigan: 11

Lead poisoning:
- Michigan: 1
- Ohio: 10

Mumps:
- Florida: 185
- Michigan: 1,256
- Nebraska: 232
- New Mexico: 584
- Ohio: 1,327
- Pennsylvania: 2,886
- Wyoming: 83

Opthalmia neonatorum:
- New Mexico: 1
- Ohio: 53
- Pennsylvania: 11

Paratyphoid fever:
- Michigan: 1
- Ohio: 1

Puerperal septicemia:
- New Mexico: 6
- Ohio: 1

February 1936—Continued

Scabies: Cases
- Michigan: 4

Septic sore throat:
- Michigan: 62
- Nebraska: 5
- New Mexico: 5
- Ohio: 138
- Wyoming: 9

Trachoma:
- Michigan: 1
- Ohio: 1

Trichonosis:
- Ohio: 7
- Pennsylvania: 1

Tularaemia:
- New Mexico: 1
- Ohio: 1

Typhus fever:
- Florida: 3

Undulant fever:
- Michigan: 5
- Ohio: 10
- Pennsylvania: 3

Vincent's infection:
- Michigan: 29

Whooping cough:
- Florida: 25
- Michigan: 1,104
- Nebraska: 53
- New Mexico: 54
- Ohio: 710
- Pennsylvania: 984
- Wyoming: 12

CASES OF VENEREAL DISEASES REPORTED FOR JANUARY 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	641	2.37	281	1.04
Arizona	70	1.53	112	2.45
Arkansas [1]	42	.22	57	.30
California	1,572	2.55	1,667	2.71
Colorado [2]				
Connecticut	207	1.25	134	.81
Delaware	109	4.50	16	.66
District of Columbia	132	2.66	125	2.52
Florida	351	2.23	132	.84
Georgia	909	3.12	456	1.57
Idaho	0	0	0	0
Illinois	1,408	1.79	1,153	1.46
Indiana	131	.40	104	.31
Iowa [1]	121	.49	174	.70
Kansas [2]				
Kentucky	182	.68	237	.89
Louisiana	367	1.69	215	.99
Maine	36	.45	50	.62
Maryland	765	4.58	200	1.20
Massachusetts	443	1.02	557	1.28
Michigan	425	.83	474	.93
Minnesota	281	1.08	283	1.09
Mississippi	1,166	5.68	1,752	8.52
Missouri	604	1.64	515	1.40
Montana [1]	55	1.02	107	1.99
Nebraska [2]				
Nevada [2]				
New Hampshire	17	.36	13	.28
New Jersey	435	1.03	245	.58
New Mexico	67	1.58	41	.94
New York [2]				
North Carolina	1,124	3.41	543	1.64
North Dakota	28	.41	52	.76
Ohio	493	.73	290	.43

See footnotes at end of table.

Reports from States—Continued

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Oklahoma[1]	173	.70	149	.60
Oregon	63	.64	112	1.13
Pennsylvania	388	.39	189	.19
Rhode Island	105	1.49	43	.61
South Carolina[1]	189	1.08	239	1.37
South Dakota	3	.04	33	.47
Tennessee	787	2.94	392	1.46
Texas	242	.40	100	.16
Utah[2]				
Vermont	19	.53	32	.89
Virginia	430	1.76	216	.88
Washington	137	.85	207	1.29
West Virginia	196	1.10	132	.74
Wisconsin[4]	25	.08	93	.31
Wyoming[2]				
Total	14,940	1.38	11,922	1.10

See footnotes at end of table.

Reports from cities of 200,000 population or over

Akron, Ohio[3]				
Atlanta, Ga.[3]				
Baltimore, Md.	481	5.83	122	1.48
Birmingham, Ala.	108	3.83	68	2.41
Boston, Mass.	443	5.60	557	7.04
Buffalo, N. Y.[3]				
Chicago, Ill.[3]				
Cincinnati, Ohio	52	1.12	53	1.14
Cleveland, Ohio[3]				
Columbus, Ohio	38	1.24	0	0
Dallas, Tex.	91	3.14	30	1.04
Dayton, Ohio	24	1.14	0	0
Denver, Colo.[3]				
Detroit, Mich.	227	1.31	263	1.52
Houston, Tex.[3]				
Indianapolis, Ind.[3]				
Jersey City, N. J.	2	.62	3	.93
Kansas City, Mo.	61	1.45	13	.31
Los Angeles, Calif.	523	3.65	518	3.62
Louisville, Ky.[3]				
Memphis, Tenn.	196	7.34	71	2.66
Milwaukee, Wis.[3]				
Minneapolis, Minn.	86	1.77	109	2.24
Newark, N. J.	186	4.01	87	1.88
New Orleans, La.[3]				
New York, N. Y.	5,894	8.07	1,404	1.92
Oakland, Calif.	25	.82	34	1.12
Omaha, Nebr.	11	.50	13	.59
Philadelphia, Pa.	260	1.31	61	.31
Pittsburgh, Pa.	46	.67	22	.32
Portland, Oreg.	51	1.62	80	2.55
Providence, R. I.	44	1.70	23	.89
Rochester, N. Y.[3]				
St. Louis, Mo.	760	9.09	530	6.34
St. Paul, Minn.	30	1.06	50	1.77
San Antonio, Tex.[3]				
San Francisco, Calif.	149	2.22	149	2.22
Seattle, Wash.	90	2.37	120	3.16
Syracuse, N. Y.	124	5.69	44	2.02
Toledo, Ohio[3]				
Washington, D. C.[5]	132	2.66	125	2.52

[1] Incomplete.
[2] Not reporting.
[3] No report for current month.
[4] Only cases of syphilis in the infectious stage are reported.
[5] Reported by Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Mar. 7, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross-section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	2	3	2	0	0	0	5	21
New Hampshire:											
Concord	0	------	0	0	1	1	0	0	0	0	11
Manchester	0	------	2	0	0	2	0	1	0	0	24
Nashua	0	------	------	24	------	0	0	------	0	0	------
Vermont:											
Barre	0	------	0	0	0	2	0	0	0	0	1
Burlington	0	------	0	4	0	2	0	------	0	0	6
Rutland	0	------	0	15	1	2	0	0	0	0	5
Massachusetts:											
Boston	2	------	1	254	35	85	0	14	0	28	219
Fall River	0	------	0	0	3	9	0	4	0	0	34
Springfield	0	------	0	1	5	7	0	2	0	1	43
Worcester	0	------	0	0	12	22	0	1	0	15	69
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	14
Providence	0	------	1	12	12	14	0	1	0	0	61
Connecticut:											
Bridgeport	1	------	0	9	2	7	0	1	0	2	27
Hartford	0	1	0	3	7	9	0	0	0	0	46
New Haven	0	6	3	0	4	1	0	0	0	40	48
New York:											
Buffalo	0	------	0	29	15	63	0	8	0	19	154
New York	32	109	28	1,335	291	723	0	103	6	68	1,368
Rochester	1	------	0	1	11	10	0	1	0	3	106
Syracuse	0	------	1	87	6	0	0	2	0	17	57
New Jersey:											
Camden	1	1	1	0	0	10	0	0	0	0	37
Newark	0	45	3	5	10	244	0	7	0	15	139
Trenton	0	------	0	0	6	4	0	1	0	7	45
Pennsylvania:											
Philadelphia	2	17	12	384	77	75	0	29	3	57	621
Pittsburgh	5	3	2	22	43	84	0	5	0	21	202
Reading	0	------	0	8	3	4	0	2	0	3	34
Ohio.											
Cincinnati	7	------	2	5	21	16	0	11	0	1	176
Cleveland	5	39	3	91	26	50	0	10	0	63	267
Columbus	1	5	5	1	15	25	0	6	0	2	112
Toledo	1	2	2	35	9	3	0	2	0	11	86
Indiana:											
Anderson	0	------	0	0	1	4	0	0	0	2	6
Fort Wayne	3	------	0	0	2	19	0	0	0	0	28
Indianapolis	7	------	0	3	10	49	0	6	1	18	108
Muncie	0	------	0	0	3	1	0	1	0	0	17
South Bend	0	------	0	1	1	4	0	1	0	4	18
Terre Haute	0	------	0	0	2	2	0	0	0	0	14
Illinois.											
Alton	1	------	0	0	2	3	0	0	0	0	9
Chicago	6	21	9	15	69	269	1	41	1	219	799
Elgin	0	------	0	0	5	4	0	0	0	0	10
Moline	0	------	0	0	2	27	0	0	0	0	9
Springfield	2	------	0	1	8	24	0	0	0	1	36
Michigan:											
Detroit	1	4	2	21	39	146	1	14	1	180	271
Flint	0	------	0	0	3	11	0	0	0	34	29
Grand Rapids	0	------	0	9	5	9	0	0	0	3	39
Wisconsin:											
Kenosha	0	------	0	1	0	4	0	0	0	8	10
Milwaukee	0	1	1	7	8	104	0	3	0	58	91
Racine	0	------	0	3	1	22	0	0	0	6	12
Superior	0	------	0	0	0	7	0	0	0	0	7
Minnesota:											
Duluth	0	------	0	0	5	3	0	1	0	14	26
Minneapolis	1	------	1	119	12	129	0	4	0	7	118
St. Paul	0	------	0	100	13	48	0	3	0	3	77
Iowa:											
Cedar Rapids	0	------	0	1	0	2	0	------	0	2	------
Davenport	0	------	------	0	------	16	0	------	0	0	------
Des Moines	2	------	------	0	------	8	0	------	0	0	37
Sioux City	0	------	------	0	------	16	4	------	0	0	------
Waterloo	0	------	------	0	------	1	0	------	0	0	------

City reports for week ended Mar. 7, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Missouri:											
Kansas City	2	43	6	2	26	58	0	9	9	1	137
St. Joseph	1	------	2	1	24	3	1	1	0	9	57
St. Louis	7	9	1	2	24	60	0	9	0	3	232
North Dakota:											
Fargo	0	------	0	1	1	3	0	0	0	0	7
Grand Forks	0	------	------	0	------	0	1	------	0	0	------
Minot	0	------	0	0	0	4	0	0	0	0	2
South Dakota:											
Aberdeen	0	------	0	1	------	0	0	------	0	0	------
Nebraska:											
Omaha	0	------	0	0	18	118	8	3	0	5	80
Kansas											
Lawrence	0	35	0	1	0	3	0	0	0	0	------
Wichita	0	2	2	3	2	32	1	0	0	4	43
Delaware:											
Wilmington	3	------	0	2	6	3	0	0	0	7	30
Maryland:											
Baltimore	2	43	3	47	40	45	0	11	1	34	253
Cumberland	1	------	0	0	0	2	0	0	0	0	16
Frederick	0	------	0	0	1	0	0	0	0	0	4
District of Col.:											
Washington	19	4	3	16	26	34	0	21	0	7	192
Virginia:											
Lynchburg	3	------	0	3	3	0	0	0	0	5	16
Norfolk	1	41	0	0	6	1	0	0	0	5	36
Richmond	0	------	5	0	12	29	0	3	0	0	82
Roanoke	0	------	0	0	4	0	0	1	0	0	20
West Virginia:											
Charleston	0	3	0	0	3	0	0	0	0	0	20
Huntington	2	------	------	0	------	2	0	------	0	0	------
Wheeling	1	------	0	2	2	0	0	0	0	0	21
North Carolina.											
Gastonia	0	1	------	0	0	0	0	0	0	0	1
Raleigh	0	------	0	0	2	0	0	0	0	3	16
Wilmington	0	6	0	0	2	0	0	0	0	0	14
Winston-Salem	0	------	1	170	1	2	0	1	0	0	13
South Carolina:											
Charleston	0	150	4	0	10	1	0	0	0	1	43
Columbia	0	------	0	0	3	0	0	1	0	0	13
Florence	1	------	0	0	0	0	0	0	0	0	2
Greenville	0	------	0	23	3	1	0	0	0	0	11
Georgia:											
Atlanta	0	133	12	1	25	7	0	8	0	1	124
Brunswick	0	2	2	0	3	0	0	0	0	0	8
Savannah	1	92	5	0	6	0	0	2	0	0	40
Florida:											
Miami	1	2	0	0	1	0	0	5	0	6	43
Tampa	1	2	0	0	3	1	0	0	0	0	23
Kentucky.											
Ashland	0	------	0	0	1	0	0	0	0	0	1
Covington	0	------	0	1	3	1	0	1	0	0	20
Lexington	0	7	0	0	5	2	0	2	0	0	24
Louisville	2	12	1	4	11	28	0	2	0	9	80
Tennessee.											
Knoxville	0	3	1	30	3	0	0	2	0	0	25
Memphis	3	------	2	1	16	8	0	9	2	1	122
Nashville	0	------	2	3	7	0	0	0	0	2	54
Alabama.											
Birmingham	2	188	13	0	23	1	0	5	0	0	110
Mobile	2	25	4	0	6	0	0	0	0	0	31
Montgomery	0	9	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	------	------	------	------	------	------	------	------	------	------	------
Little Rock	0	------	0	0	8	2	0	0	0	0	8
Louisiana:											
Lake Charles	0	------	1	0	0	0	0	1	0	0	7
New Orleans	13	19	8	34	27	10	0	12	0	50	187
Shreveport	1	------	0	16	13	4	0	3	0	0	51
Oklahoma:											
Oklahoma City	1	14	0	2	12	12	0	1	0	0	48
Texas:											
Dallas	8	9	9	122	14	3	0	3	0	1	91
Fort Worth	0	------	1	0	8	10	0	2	0	0	44
Galveston	5	------	0	21	6	2	2	0	0	0	20
Houston	6	------	6	8	22	1	0	5	0	0	92
San Antonio	3	------	10	0	17	0	0	11	0	0	108

City reports for week ended Mar. 7, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	1	5	0	0	1	1	0	0	0	0	3
Great Falls	0	------	0	0	1	10	0	0	0	2	11
Helena	0	------	0	0	0	0	0	0	0	0	6
Missoula	0	------	0	0	2	5	0	0	0	0	10
Idaho:											
Boise	0	------	0	12	1	4	0	1	0	0	9
Colorado:											
Colorado Springs	0	------	0	0	3	4	1	3	0	0	22
Denver	6	------	7	7	12	27	0	4	0	9	97
Pueblo	0	------	0	0	3	35	0	0	0	8	17
New Mexico:											
Albuquerque	0	1	1	1	0	25	0	2	0	2	12
Utah											
Salt Lake City	0	------	1	4	3	73	1	2	0	7	35
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington.											
Seattle	0	------	6	97	20	24	3	6	0	4	138
Spokane	0	2	2	2	10	21	0	0	0	6	35
Tacoma	0	------	0	40	7	2	0	2	0	1	35
Oregon:											
Portland	0	16	4	222	17	10	0	2	0	2	128
Salem	1	13	------	4	------	1	0	------	0	2	------
California											
Los Angeles	7	140	3	546	38	88	0	22	0	27	354
Sacramento	2	5	2	13	5	4	0	2	0	10	36
San Francisco	0	18	1	612	7	89	0	10	0	39	186

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts			
Boston	4	5	0
Rhode Island			
Providence	1	0	0
New York			
New York	29	6	0
New Jersey			
Newark	3	2	0
Pennsylvania			
Philadelphia	3	1	0
Pittsburgh	4	1	0
Reading	2	1	0
Ohio			
Cincinnati	3	2	0
Cleveland	2	0	0
Toledo	1	0	0
Indiana			
Indianapolis	0	1	0
Illinois			
Chicago	9	4	0
Springfield	3	1	0
Michigan			
Detroit	0	0	2
Wisconsin			
Milwaukee	1	0	0
Minnesota			
Minneapolis	1	0	0
Iowa			
Sioux City	1	0	0
Missouri:			
St Joseph	4	0	0
St. Louis	2	0	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Nebraska			
Omaha	0	1	0
Maryland			
Baltimore	8	1	0
District of Columbia:			
Washington	3	0	0
Virginia			
Norfolk	1	0	0
Richmond	2	1	0
West Virginia			
Wheeling	0	1	0
South Carolina			
Charleston	10	2	0
Georgia			
Atlanta	9	1	0
Florida			
Miami	1	1	0
Kentucky			
Louisville	3	0	0
Tennessee			
Memphis	0	3	0
Nashville	1	0	0
Louisiana			
Shreveport	0	6	0
Oklahoma			
Oklahoma City	2	0	0
Texas			
Houston	3	2	0
Washington			
Seattle	1	2	0
California			
Los Angeles	5	1	1
San Francisco	1	1	0

Epidemic encephalitis.—Cases. New York, 5, Newark, 1, Philadelphia, 1, Columbus, 1, Toledo, 1.
Pellagra.—Cases. Chicago, 2, Detroit, 1, Atlanta, 2, Savannah, 1, Birmingham, 2, Dallas, 1.

FOREIGN AND INSULAR

CZECHOSLOVAKIA

Communicable diseases—December 1935.—During the month of December 1935, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	3		Malaria	8	
Cerebrospinal meningitis	15	7	Paratyphoid fever	3	
Chickenpox	498		Poliomyelitis	13	4
Diphtheria	3, 219	222	Puerperal fever	47	19
Dysentery	68	18	Scarlet fever	3, 323	42
Influenza	122	2	Trachoma	87	
Lethargic encephalitis	3	1	Typhoid fever	470	43

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Week ended— December 1935				January 1936				February 1936				
						7	14	21	28	4	11	18	25	1	8	15	22	29
India	C	57,713	51,707	29,882	25,638	3,355	4,620	1,619	2,021	3,695	3,674							
	D	29,945	24,303	15,039	13,350	1,850	2,401	839	1,079	1,873	2,014							
Assam	C	1,706	585	164	658	204	154	211	138	72	77	120	49	85		21	21	15
	D	871	286	79	356	103	104	109	80	46	39	62	20	19		11	7	9
Bombay Presidency	C	6,236	7,779	3,318	1,892	387	357	148	49	74	149	157	79	141				
	D	2,687	3,328	1,510	877	183	165	67	30	44	75	79	39	58				
Bombay	C	6	3		[1]1													
Calcutta	C	216	119	90	144	24	29	38	12	15	28	57	40	47	58	61	79	135
Central Provinces and Berar	C	7,243	11,774	5,775	1,350	47	40	6	5	13	1					8	18	30
Chittagong	C	7			1													
Cochin	D	1	11	9														
Madras Presidency	C	7,487	8,185	4,648	5,280		1,311	1,004	540	1,583	186							
	D	3,249	3,482	2,114	2,527		625	454	257	786	94							
Madras	C	137	31	8	12	3	5	4	1		2	3	4	11	28	18	3	10
	D	57	15	1	4	4	2	1				1	2	6	6	8	4	2
Moulmein	C	1															1	1
Negapatam	C							4	3	3	7	5	7	2	14	5	18	17
	D							2	2	2	4		2		6	9	7	5
Northwest Frontier Province	C	80	338	12								1			1			
	D	36	174	[1]1														
Punjab	C	516	302	154	24				7		1							
Rangoon	C				[1]1					[1]1								
Vizagapatam	C	1																
India (French):																		
Chandernagor	C	16	1								4	2	2					
Karikal	C			4	12													
Pondichery	C	39	83	16	5													
Indochina (see also table below): Pnom-Penh	C	1		1														

[1] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct 27–Nov 30, 1935	Week ended— December 1935 7	14	21	28	January 1936 4	11	18	25	February 1936 1	8	15	22	29
Philippine Islands:																		
Occidental Negros Province	C	1																
	D	1																
Rizal Province	C	1																
Siam:																		
Ang Thoang Province	C			10	3										1	1	1	
	D			9	3										1	1	1	
Ayudhaya Province	C		46	30	25		11	17	12	17	9	23	25	31	46	45	53	35
	D		31	25	16		6	19	10	11	6	16	16	27	28	35	41	28
Bangkok	C	1	43	44	77	16	5	14	14	17	21	39	47	31	82	96	91	75
Bajrpuri Privince	C	13	14	14	3					1	9	20	26	19	9	15	13	10
Bisnulok Province	C																1	12
Chhaxoengsao Province	C						3	25	27	14	60	57	44	51	23	11	8	2
Jalapuri Province	C								3	6	1	8	5		9	1		2
Lobpuri Province	C							9	1						2	3	1	1
Nagara Nayok Province	C														2	5		8
Nagara Pathom Province	C			11	25	1				3	1						4	7
Nagara Rajsima Province	C														1	1		
Nagara Svarga Province	C														7	6	1	1
Nondpuri Province	C		2	8	19	3				1		2	4		12	2	2	5
Prachinpuri Province	C				14	17	9	4	24	5	7	12	2	4				
Pradumdhani Province	C			6	2	1					1		3	14	5	7	3	12
Rajpuri Province	C	72	107	18	36	16	10	16	12	24	29	10		5	3	1		7
Sarapuri Province	C			6	17						2			15	41	27	16	5
Singhapuri Province	C			11	15				2		1						1	
Smudprakar Province	C		5	5	6	8		20	21	5	1	6	3	25	48	27	28	36
Smudsagara Province	C	7	9	9	7	11	4	1	20	8	25	16	9	14	17	25	9	11
Smudsongram Province	C	51	56	23	34	6	7	12	13	16	12	8	13	14	12	21	20	17
Subarnpuri Province	C				18											4	5	8
On vessels:																		
S. S. *Eyre* at Rangoon	C										1							
S. S. *Floristan* at Masulipatam	C											[2] 1						

Place		September 1935			October 1935			November 1935			December 1935			January 1936		
		1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indochina (French) (see also table above):																
Cambodia [3]	C					1				1				1		1
	D					1								1		1
Cochinchina [3]	C		1		1 [2]	1			1	1		2	1			2
	D		1			1			1			2	1			2

[2] Suspected.

[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct 26, 1935	Oct. 27–Nov. 30, 1935	Week ended— December 1935: 7	14	21	28	January 1936: 4	11	18	25	February 1936: 1	8	15	22	29
Algeria: Philippeville	C			3														
Argentina (see also table below):																		
Bahia Blanca (vicinity of)	C																	[8] 1
	D																	
Buenos Aires Province.[3]																		
Pampa Territory—Leventue.[4]																		
San Luis.[5]																		
Azores. (See table below.)																		
Belgian Congo	C	2	2	1														
Plague-infected rats				3														
Bolivia. (See table below.)																		
Brazil.[6] (See also table below.)																		
British East Africa.																		
Kenya	C	26	33	10	7	3	19	1	2	4	1	2	3	4	4	3		
Tanganyika	C												7			1		
Uganda	C	231	188	206	281	25	21		15	6	7	19	12	6	8	3		
	D	226		188	231	20	19		15	5	6	18	11	5	8	3		
Ceylon:																		
Balapitiya	C				1													
Colombo	C	4	11	6	5	2	4	3	2	3	2	2	3	1		2	2	1
	D	4	8	6	4	2	4	2	2	3	2	2	2	1		2		
Plague-infected rats				14	27		1	3										1
Ratnapura	C			1														
Tellijjawilla	C			1														
China (see also table below): Manchuria.[7]																		
Dutch East Indies: West Java	C	670	868	769	985													
	D	668	866	769	980													
Ecuador:																		
Dauls[8]																		
Duran	C			1														
Guayaquil	C	3	8	35	48	13	2	5			3	4	1		2	1	2	1
	D		3	15	16	1		2	1		1	3	2	1	2			
Plague-infected rats				8	12			4	1	1	1							
Nobol	C			1														
Egypt:																		
Alexandria—Plague-infected rats		P	P	P	P	P			P		P		P		P			
Asyut Province	C	1			1		1	2		1	2	2	1	3	1	2	1	2
Girga Province	C											1		1			1	
Minya Province	C																	2
Qena Province	C			1														

Great Britain—England—Liverpool—Plague-infected rats						2												
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district—																		
Hamakua Mill					1				1								1	
Kalopa		1																
Kukaiau				1	2	1												
Paauhau			1	2						1								
Pohakea Sector																1		
Maui Island—Makawao district—Kahului (9-10 miles from)		2	1															
India	C	947	1,433	2,635	3,101	481	514	419	438	415	497	827						
	D	483	633	1,228	1,019	196	249	214	269	197	297	306						
Bassein	C	1	3	1			1								3	1	3	
Plague-infected rats		1			1											1		
Bombay Presidency	C	162	163	363	148	34		37	17	15	32	28	24	15				
	D	79	94	234	93	12		22	14	8	22	18	13	17				
Bombay	C												[9]1					
Central Provinces and Berar	C	255	483	464	1,651	208	272	110	117	55	137		2	28	75	165	150	196
Madras Presidency	C	49	111	121	133		28	43		10	7							
	D	21	46	73	88		21	30		4	4							
Punjab	C				48									1				
	D				21													
Rangoon	C	6	1	1		[9]1										[9]1		
Plague-infected rats		1	1	1		1								1	1		1	
Indochina (see also table below):																		
Pnom-Penh	C												1					1
Saigon-Cholon	C	2											1					
Iraq: Baghdad	C	3	1		1		1			[9]1								
Madagascar. (See table below.)																		
Peru. (See table below.)																		
Senegal. (See table below.)																		
South-West Africa. (See table below.)																		
Tunisia: Tunis	C	2	10	2	1											2		
	D		2		1													
Plague-infected rats		1			1													
Union of South Africa	C	4	8	18	7	[10]2		[10]5		[10]24		[10]20		[10]91		[10]18		
Cape Province	C					1	1											
Orange Free State	C				1	1												
On vessel: S. S. *Ipanema* at Marseille	C			[11]2														

[1] Including plague in the United States and its possessions. [2] Suspected.

[3] A report dated Mar. 9, 1936, states that 2 cases of plague with 2 deaths occurred at Ingeniero White, Buenos Aires Province, Argentina.

[4] A report dated Aug. 8, 1935, states that 4 cases of plague occurred at Leventue, Pampa Territory, Argentina, during 2 months.

[5] A report dated Aug. 2, 1935, states that plague-infected rats were present at San Luis, Argentina.

[6] Reports of plague in Brazil have also been received under the dates indicated, as follows: July 25, 1935, 4 cases at Vicosa, Alagoas State; July 2, 1935, about 16 deaths in Fiera Santanna, Bahia State, since Jan. 1; July 26, 1935, 10 cases in Ceara State since Jan. 1; Sept. 10, 1935, 204 cases with 72 deaths in Pernambuco State up to Aug. 24; Oct. 8, 1935, 4 cases and 1 death at Paulista, Piauhy State.

[7] A report dated Oct. 28, 1935, states that up to Oct. 23, 155 deaths from plague were reported in the provinces of Kirin, Lungkiang, Fengtien, and South Hsingan, Manchuria, China. A report dated Nov. 27, 1935, stated that 23 deaths from plague had occurred in the vicinity of Koshan, and that there were about 15 cases in Harbin.

[8] During the period Jan. 1 to Feb. 20, 1936, 7 cases of plague were reported at Daule and vicinity, Ecuador. [9] Imported. [10] For 2 weeks.

[11] One of these cases was a member of the crew and the other was a stevedore believed to have worked on the vessel. Several plague-infected rats were reported found on board the vessel.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

Place		August 1935	September 1935	October 1935	November 1935	December 1935	January 1936
Argentina (see also table above):							
Cordoba Province	C					5	1
Santa Fe	C						1
Azores	C	3	4	2	2	2	
Basutoland	C					16	
Bolivia	C	[2] 4					
Brazil: Bahia State	C		7	3	7	20	
Indochina (see also table above):							
Cambodia	C		1				1
Cochinchina	C	1			1		1
Madagascar (central region)	C	138	232	293	345	507	
	D	133	227	282	333	485	
Peru	C	10	3	1	14	9	23
Catamarca Department	C				13		
Lambayeque Department	C					1	4
Peru—Continued.							
Libertad Department	C		1	1	1		5
Lima Department	C	5	2		10	7	9
Callao	C	3					1
	D	2					1
Lima	C	5					
	D	2					
Senegal:							
Baol [12]	C	16	8				
Dakar [12]	C	2					1
	D	1					1
Rufisque [12]	C	4					
Theis [12]	C	22					
Tivaouane [12]	C	46	11	1	1	1	
South-West Africa: Ovamboland [13]	C						

[2] Suspected.
[12] Incomplete reports.
[13] From the beginning of 1935 up to Sept. 30, 185 cases of plague were reported in Ovamboland, South-West Africa.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Week ended— December 1935: 7	14	21	28	January 1936: 4	11	18	25	February 1936: 1	8	15	22	29
Algeria: Algiers Department	C		5													1	1	
Argentina [1]																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil:																		
Porto Alegre (alastrim)	C	44																
Santos	C		2															

British East Africa:																		
Kenya	C	7																
Tanganyika	C	59	36	6	18								9	6		2		
Uganda	C											8	2	1	1	3		
British Somaliland	C	3	25	4	3	2	1		4	2	1	1						
British South Africa:																		
Northern Rhodesia	C		1															
Southern Rhodesia	C			1														
Canada:																		
Alberta	C	[2] 1			[2] 1						[2] 1						1	2
British Columbia	C	[2] 1	5	[2] 1	[2] 1		1		1			1	1					
Saskatchewan	C			[2] 3	[2] 1													
Canary Islands: Santa Cruz de Tenerife	C	1																
Ceylon: Colombo	C											1						
Chile: Chuquicamata	C	1																
China:																		
Amoy	C	1																
Dairen	C	2													P			
Foochow	C	P	P	P	P		P				P		P					
Hangchow	C								1		1	2		1				
Hankow	C													1	1			
Hong Kong	C				2													
Nanking	C				26	19	5	5	14	1	7	5	3	8				
Shanghai	C	5	1	2	4	1	2		3	1	1	2	1	4	2	9	5	10
Swatow	C		1		3	1												
Tientsin	C	1				1	1		1									
Tsingtao	C	1																
Chosen. (See table below.)																		
Colombia	C	3	111		44		14	15	3	7	11	20	30		[2] 13			
Bogota	C	10			8	3												
Dahomey. (See table below.)																		
Egypt: Provinces	C															2		
Eritrea	C	5	14	7												1		
Asmara	C			4														
France. (See table below.)																		
Greece: Salonika	C	8	6		4						2	2	2	2	3			
Guatemala. (See table below.)																		
Honduras: Tela	C			2														
India	C	10,576	5,530	4,147	8,642	2,038	2,946	2,235	2,398	4,618	4,755	5,146						
	D	2,735	1,256	865	[1] 1,762	450	616	422	618	857	962	1,231						
Assam	C	100	19	10	17	43	26	47	52	38	18	23	37	303	59	130	164	142
Bassein	C										[2] 1							
Bombay Presidency	C	1,678	748	457	635	183		363	195	279	490	398	536	504				
	D	363	133	65	90	32		38	33	67	60	66	89	104				
Bombay	C	54	24	11	21	8	6	6	10	13	22	18	33	38	46	47	72	63
	D	33	15	4	12	7	2	5	7	8	15	9	17	19	27	21	46	36
Calcutta	C	53	24	13	19	7	13	27	41	49	105		116	228	270	309	378	426
	D	27	15	5	12	3	9	14	30	29	45		59	131	180	24	258	300
Central Provinces and Berar	C	340	114	380	475	185	273	214	136	125	386	340	415	415	965	502	280	490
Chittagong	D											1					1	

[1] A report dated Oct. 25, 1935, states that 19 cases of smallpox have been reported in Entre Rios Province, Argentina.
[2] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Week ended— December 1935 7	14	21	28	January 1936 4	11	18	25	February 1936 1	8	15	22	29
India—Continued.																		
Cochin	C			5	1									6			8	
Karachi	C	7	1	2	3		1	9	[3] 1		7	9	1	8	10	16	26	17
Madras Presidency	C	3,465	2,246	1,664	1,811		440	527	399	529	76							
	D	573	401	339	324		76	93	100	80	6							
Madras	C	10	10	1	7	3		2		1	2				1		1	1
Moulmein	C	18	5		2	2			4	1		6	20	16		17	13	15
Negapatam	C	17	3	2						2			1		1	1		
Northwest Frontier Province	C	6	2		9	2	3	1	1	4	11		11	6	5	5	29	5
Punjab	C	72	79	99	336	73	96	82	62	148	83	118	149	116	111	173	183	
Rangoon	C	8	2	1	[3] 1	[3] 1	[3] 1	2			[3] 2	1	[3] 6	[3] 1	1	3	4	1
Tuticorin	C	25	12	11	3			5										
Vizagapatam	C	14	14	18	6		1	5	3	4	10	15	7	12	9	2	4	12
India (French):																		
Chandernagor	C	4	5	4	44													
Karikal	C	44	12	25	1													
Pondichery	C	51	22	11	3													
	D	39	24	8	3					3	1		3					
Indochina (see also table below):																		
Haiphong	C	1																1
Iran	C	2	3	19	3	3		5	4	8			1					
Teheran	C		2	3														
	D		1	1														
Iraq	C	9		11	8	9	17	4	6	7	20	28	3	7	9	4	18	2
Arbil	C	1																
Baghdad	C				2						1			1				
Basra	C			1	1													
Italian Somaliland	C				2													
Japan: Yamaguchi Prefecture	C												1					
Libya: Tripolitania	C									2								
Mexico (see also table below):																		
Chihuahua	C				1								1					1
Guadalajara	D	1	2	1	9	3	1	4	8	4	5	4		8	9		14	15
Mazatlan	C				1									1				
Mexico, D. F.	C	51	19	3	12	2	1	2		2	2							
Monterrey	C			1	1													2
San Luis Potosi	D	2	4															
Torreon	C				5	1				1								
Morocco. (See table below.)																		
Mozambique. (See table below.)																		

Nigeria	C	124	290	289	146	[2] 74	------	[2] 353	------	8	------	------	------	------	------	------	------	------
Niger Territory. (See table below.)																		
Nyasaland. (See table below.)																		
Oman: Sharjah and Pirate Coast	C	------	------	------	------	------	------	------	------	750	------	------	[4] 125	------	------	------	[4] 70	------
Peru. (See table below.)																		
Poland	C	1	------	------	1	------	------	------	------	------	------	------	------	------	1	------	------	------
Portugal (see also table below): Lisbon	C	2	2	3	5	5	------	1	2	1	2	------	------	1	------	1	------	------
Salvador. (See table below.)																		
Saudi Arabia	C	1	------	------	4	------	------	------	------	------	------	------	------	------	------	------	------	------
Sierra Leone	C	344	288	110	222	[2] 38	------	[3] 78	------	[2] 31	------	[3] 6	------	------	------	------	------	------
Freetown	C	3	2	7	------	2	------	------	------	------	------	------	------	------	------	------	------	------
Spain	C	13	12	7	1	------	------	------	1	3	9	7	1	------	------	1	------	------
Straits Settlements: Singapore	C	12	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Sudan (Anglo-Egyptian)	C	7	------	------	2	------	------	------	------	3	------	------	------	------	------	2	1	2
Syria: Tripoli	C	------	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Turkey. (See table below.)																		
Union of Socialist Soviet Republics. (See table below.)																		

[2] For 2 weeks.
[3] Imported.
[4] For 3 weeks.

On vessels:

S. S. *Englistan* at Rangoon from Gopalpore	1 case	July 30, 1935
S. S. *Hong Kheng* at Singapore from Amoy	2 cases	Aug. 1, 1935
S. S. *Barenfels* at Gibraltar	1 case	Aug. 23, 1935
S. S. *Talamba* at Rangoon from Madras	1 case	Sept. 9, 1935
S. S. *Ethiopia* at Rangoon from Madras	1 case	Oct. 4, 1935

On vessels—Continued.

S. S. *Ekma* at Rangoon from Calcutta	1 case	Dec. 10, 1935
S. S *Cape St. Francis* at Rangoon from Calcutta	1 case	Dec. 17, 1935
S. S. *Bankura* at Karachi	1 case	Jan. 4, 1936
S. S. *Jalgopal* at Rangoon from Aracan	1 case	Jan. 5, 1936
S. S. *Matua* at Suez from Calcutta	1 case	Jan. 21, 1936

Place		August 1935	September 1935	October 1935	November 1935	December 1935	January 1936
Belgian Congo	C	261	303	248	------	54	201
Bolivia	C	30	57	23	38	43	48
China: Manchuria—Harbin	C	------	------	1	------	------	------
Chosen	C	32	16	53	53	------	------
Dahomey	C	2	3	------	31	11	------
France	C	1	6	16	7	18	76
Guatemala	C	------	4	------	1	------	2
Indochina (see also table above)	C	138	103	98	66	44	57
	D	30	16	12	10	3	3
Mexico (see also table above):							
Guanajuato State	C	2	------	------	------	------	------
Leon	C	2	------	------	------	------	------
Jalisco State	C	1	------	------	------	------	------
Guadalajara	C	1	------	------	------	------	------
Mexico, D. F.	C	35	------	------	------	------	------
Mexico City	C	31	2	2	------	------	------
Oaxaca State	C	23	------	------	------	------	------
Mexico (see also table above)—Con.							
Puebla State:							
Puebla	C	1	------	------	------	------	------
San Luis Potosi State	C	5	------	------	------	------	------
San Luis Potosi	C	5	------	------	------	------	------
Vera Cruz State	C	3	------	------	------	------	------
Vera Cruz	C	1	------	------	------	------	------
Morocco	C	------	1	------	------	------	9
Mozambique	C	2	37	15	1	------	------
Niger Territory	C	209	111	127	------	43	------
Nyasaland	C	11	14	24	19	------	------
Peru	C	154	141	------	7	------	------
Portugal (see also table above)	C	------	52	154	103	74	------
	D	------	9	34	26	11	------
Salvador	C	2	------	------	36	12	32
Turkey	C	------	------	1	------	------	------
Union of Socialist Soviet Republics	C	128	47	------	------	------	------

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Week ended— Nov. 1935: 2	9	16	23	30	Dec. 1935: 7	14	21	28	Jan. 1936: 4	11	18	25	Feb. 1936: 1	8	15
Algeria:																				
Algiers Department	C	1	1	1		1										1	3	3	6	
Algiers	C													1						
Constantine Department	C	3	4	5		1								3	18		4	5	24	10
Bone	C		2												1					
Constantine	C		1	1										2	1					
Oran Department	C																7			50
Australia:																				
Queensland	C	1																		
Sydney	C							1	1								1			
Belgian Congo	C			1																
Bolivia. (See table below.)																				
Bulgaria	C		1																	
Chile	C	397	285	473			[1] 460													
Concepcion	C	52	32	21																
Santiago [3]	C	245	172	333																
Valparaiso	C	8	24	26	25	2	17		12	6	15	10	6	3	2		7	6	8	5
China:																				
Canton	C						2													
Hankow	C	1	1	3			1													
Harbin.[4]																				
Hong Kong	C		1																	
Nanking	C				1															
Shanghai	C	1									1	1	1							
South Manchuria Railway Zone	C		2					4												
Tientsin	C					1														
Tsingtao	C	6	7									3								
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C									1					1					
Asyut Province	C	4		1			1												5	2
Beheira Province	C	9	2	10			5	6		8		4			22		6	14	16	52
Beni-Suef Province	C	1																		
Cairo	C	1	1														1	3	3	

Dakahliya Province	C	1															1		10	25
Damietta	C		1																	
Faiyum Province	C						1													
Gharbiya Province	C	16	2				1								6		40	26	36	16
Girga Province	C	1						1									1			
Minufiya Province	C	1	1																26	4
Minya Province	C	3																		
Port Said	C	2	1																	
Qena Province	C						1												2	1
Sharkiya Province	C	1															1	1		
Suez	C							1												
Provinces	C	41	18	14	[3] 1	1	10	8	6	13	9	4	15	49	35		54	44		103
France. (See table below.)																				
Greece: Salonika (see also table below)	C								1	1	1	1	1	1		1	1	1	2	
Guatemala. (See table below.)																				
Hawaii Territory—Honolulu	C	1		6					1	1										
Hungary	C														3					
Iran	C	29	21	5		2		3	2		1	1		2	4	5	6	3		
Teheran	C	1	3	2										1						
Iraq	C										17				19					
Baghdad	C	1																		
Basra liwa	C		1																	
Irish Free State: Waterford County: Youghal, District No. 2	C							1												
Japan	C															1				
Lithuania	C	6	3				1		[1] 18					12		[1] 57			9	
Mexico (see also table below):																				
Mexico, D. F.	C	142	134	50	23	15	8	7	7	16	24	28		9	26					
Torreon	D		2																	
Morocco (see also table below)	C	19	3	1	7				1	1	8		3	2	2	2	33	7	11	1
Palestine: Haifa	C	[3] 7	[3] 11	8	4	4	1	1	1					[3] 2						1
Panama Canal Zone. (See table below.)																				
Peru. (See table below.)																				
Poland	C	130	56	109	23	23	24	34	55	59	63	73	35	55	96	100	131	101	153	121
	D	10	2	4	2		2	2	2	5	6	6	5	6	6	6	6	16	7	6
Portugal. (See table below.)																				
Rumania. (See table below.)																				
Straits Settlements: Singapore	C	2	1	1		1				1			1	1	1	1				
Trans-Jordan	C	1	2	2												3	3	5	4	1
Tunisia:																				
Tunis	C	1	4	2	1					1						3	2			
Provinces	C	56	18	13	2	1	1		2	4		20	7	12	34	10	5	20	4	9
Turkey. (See table below.)																				
Union of Socialist Soviet Republics. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: S. S. *Agamemnon* at London	C		1																	

[1] For 2 weeks.
[2] A report dated Jan. 20, 1936, states that there were 305 cases of typhus fever with 58 deaths in Santiago Province, Chile, from Nov. 2-16, 1935.
[3] Includes imported cases.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

Place		August 1935	September 1935	October 1935	November 1935	December 1935	January 1936
Bolivia	C	150	140	88	134	168	135
China: Manchuria—Harbin	C			1	3		
Chosen	C	31	17	20	30		
Czechoslovakia	C	3	1	12			
France	C	1					
Greece	C	1	4	6	4	9	
Guatemala	C	24	43	18	26	7	9
Mexico (see also table above):							
Coahuila State	C	1					
Guanajuato State	C	7					
Leon	C	6					
Jalisco State	C	8					
Guadalajara	C	1					
Mexico State	C	15					
Mexico, D. F.	C	159					
Mexico City	C	155					
Nayarit State	D	6					
Oaxaca State	C	6					
Puebla State:							
Puebla	C	9					
Queretaro State	C	5					

Place		August 1935	September 1935	October 1935	November 1935	December 1935	January 1936
Mexico—Continued							
San Luis Potosi State	D	3					
San Luis Potosi	C	1					
Sonora State	C	4					
Vera Cruz State	C	7					
Vera Cruz	C	2					
Morocco	C	12	3	8		13	45
Panama Canal Zone	C			5	1	1	
Peru	C	3	41	16			
Portugal	C		3	2			
Rumania	C	36	26	37	92	210	
Turkey	C	34	10	13	18	35	
Istanbul	C						2
Union of Socialist Soviet Republics	C	2,191	2,205				
Union of South Africa:							
Cape Province	C	97	55	66	79	78	
Natal	C	4			6	1	
Orange Free State	C	37	10	23	18	4	
Transvaal	C	6	2	2	26	12	
Yugoslavia	C	31	11	6	10		131

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		July 28–Aug. 31, 1935	Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Week ended— November 1935					December 1935				January 1936				February 1936	
					2	9	16	23	30	7	14	21	28	4	11	18	25	1	8
Brazil:[1]																			
Bahia State	C												1	2					
Matto Grosso State[1]	C												1			1		1	
Minas Geraes State[1]	C	9										2	8	3	2	3		2	3
	D											2	3	3	2	3		2	3
Para State	C			1															
Parana State[1]																			
Sao Paulo State[1]	C	1										2	2	1		3			2
Colombia:																			
Intendencia of Meta	C	1	1																
Acacias	C	1				2													
Restrepo	C					2													
Gold Coast:																			
Bawku	C			3															
Cape Coast	C	1																	
Kumasi.[2]																			
Tamale	C		1																
Ivory Coast:																			
Abidjan	C							1				1							
Sassandra	C					1													
Senegal:																			
Dakar	C											[3] 1							
Kolda.[4]																			
M'Bake	C											1							
Sudan (French): Koutiala	C			1				1											

[1] Yellow fever has also been reported in Brazil as follows: Matto Grosso State, week ended Feb. 29, 1936, 1 case, 1 death; Minas Geraes State, week ended Feb. 15, 1936, 2 cases, 2 deaths; Parana State, week ended Feb. 15, 1 case, 1 death, Feb. 22, 4 cases, 4 deaths, Feb. 29, 2 cases, 2 deaths; Sao Paulo State, week ended Feb. 15, 1936, 2 cases, 2 deaths, Feb. 22, 1 case, 1 death, Feb 29, 1 case, 1 death.

[2] During the week ended Feb. 29, 1936, 1 case of yellow fever with 1 death was reported at Kumasi, Gold Coast.

[3] Suspected.

[4] The case reported at Kolda, Senegal, as yellow fever, during the week ended Feb. 1, 1936, and published in PUBLIC HEALTH REPORTS on pages 180 and 240 was not yellow fever.

X

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PUBLIC HEALTH REPORTS

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UNITED STATES PUBLIC HEALTH SERVICE

W. F. DRAPER, *Acting Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen R. C. WILLIAMS, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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CHANGES IN THE INCIDENCE AND FATALITY OF SMALLPOX IN RECENT DECADES *

By A. W. Hedrich, Sc. D., *Associate in Biostatistics, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Md.*

A. International Aspects

It is a striking, but, by itself, a misleading, fact that of 26 countries reporting smallpox morbidity to the League of Nations from 1921–30, the United States showed the highest reported attack rate with the exception of British India. This questionable distinction may be due to some extent to better reporting in the United States than prevails in some other countries; but a more significant factor appears to be that the strain of smallpox endemic with us is of a mild variety, which is less than 1 percent as fatal as the classical or malignant type,[1] and is accordingly more difficult to control. Classical smallpox has a case fatality in partially vaccinated populations, such as ours, averaging roughly 25 percent; the variety endemic with us, however, has a fatality of 0.2 percent or less (*1a, 2a*).

An examination of contrasts between different countries in respect of smallpox is interesting, and helps to suggest a possible reason for the predominance of mild smallpox over severe in this and certain other countries.

* From the School of Hygiene and Public Health, Department of Biostatistics (Paper No. 204) and the Office of Statistical Investigations, U. S. Public Health Service. Presented at the Conference of State and Territorial Health Officers with the Surgeon General of the Public Health Service, Washington, D. C., June 8, 1934.

The writer is greatly indebted to Dr. S. D. Collins, senior statistician, in charge of the Office of Statistical Investigations, U. S. Public Health Service, at whose invitation this study was undertaken, and who furnished much of the raw material and gave valuable suggestions and criticisms. He is further indebted to Dr. L. J. Reed and Dr. W. H. Frost, of the School of Hygiene and Public Health, The Johns Hopkins University, to correspondents mentioned in the text, and to the following discussants of this paper at its presentation: Dr. Charles Armstrong; Dr. Stanley Osborne; Dr. F. F. Russell; Dr. J. P. Leake; and Dr. A. T. McCormack. Comments of these individuals have been incorporated into the paper in the form of corrections or altered emphasis.

[1] In discussions of smallpox, it is necessary to differentiate clearly between symptoms and causative virus. It is held by most observers that the virus itself runs true to type, or, at best, mutates rather rarely or gradually in passing from person to person (*1b, 2a*). Symptoms, of course, vary greatly with host immunity, even when produced by the same virus. *In this paper, such expressions as "malignant" or "mild" smallpox ordinarily refer to the virus of variola major or minor, respectively, and not to the symptoms produced.*

This division into two types of virus is made largely on the basis of expediency, without losing sight of variation, or possible occurrence of intermediate types. Alastrim and Kaffir milk-pox of South Africa, of the West Indies, and other places are considered to be essentially variola minor.

SMALLPOX INCIDENCE IN VARIOUS COUNTRIES

In figure 1 is shown an approximate representation of the smallpox incidence in various parts of the world based mainly upon statistics for the period 1921–30, as reported to the League of Nations (3). The black areas represent the highest rates, i. e., those exceeding 50 per 100,000 population per year; the cross-hatched areas represent intermediate rates, i. e., from 5 to 50 per 100,000; and the stippled areas represent the lowest rates, that is, under 5 per 100,000. The unshaded areas are those from which satisfactory information is lacking. In table 1 are shown case rates for individual countries. While a large margin of error is to be attached to the individual rates, it is believed that the general relationships shown in the graph are substantially correct.

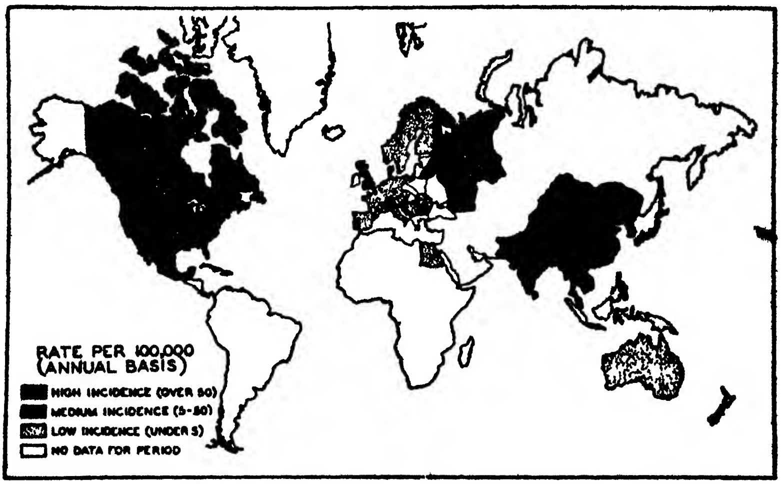

FIGURE 1.—Reported smallpox case rates in certain countries—average, 1921–30.

Summarizing the picture presented in figure 1, we note that very high rates appear to have occurred in India, China, and Mexico. In the absence of morbidity data for Mexico, a high case rate is deduced from the high mortality; the Mexican situation will be discussed later in greater detail. A high incidence in China is inferred from general statements appearing in the literature. It seems highly probable that large areas in Africa and South America also suffer high rates.

The intermediate rates, from 5 to 50 per 100,000, occurred during 1921–30 mainly in the Anglo-Saxon countries, including England, the United States, and Canada. Since 1930 the incidence in England has steadily fallen and in 1933 was at a very low level (table 3). Russia and Switzerland fall into this intermediate group, but are somewhat out of place there, in that they began the decade with an extremely high rate and ended with exceedingly low ones, due to widespread

vaccination campaigns, which reduced smallpox almost to the vanishing point.

The very lowest rates occurred mainly in continental Europe, Australia, and Japan. One may be inclined to doubt the genuineness of the low rates in some of the central European countries, but a ready explanation is found in the vaccination policies, which will be next reviewed briefly.

TABLE 1.—*Morbidity, mortality, and apparent case fatality from smallpox in various countries, for various periods, 1921–30* [1]

Geographic area	Number of cases for years indicated (1)	Reported annual case rate per 100,000 population (2)	Number of deaths for years indicated (3)	Reported annual death rate per 100,000 population (4)	Case fatality (deaths per 100 reported cases) (5)	Years included (6)
Mexico [2]	(3)	[4]163.0	96,526	69.9	(3)	1922–30
British India [5]	979,738	74.2	414,659	31.4	42.3	1926–30
United States [6]	381,890	40.4	3,483	.37	[7].9	1921–30
Canada [2]	15,000	21.6	140	.20	[7].9	1924–30
England and Wales	73,115	18.6	246	.06	.3	1921–30
Soviet Russia [8]	209,715	[9]18.2	(3)	(3)	(3)	1921–30
Switzerland	5,494	[9]14.1	16	.04	.3	1921–30
Chosen	20,721	[9]11.5	5,979	3.31	28.9	1921–30
Java and Madura	20,069	[9]5.3	3,695	.98	18.4	1921–30
Egypt	5,353	3.8	1,222	.88	22.8	1921–30
Yugoslavia	4,241	[9]3.4	915	.74	21.6	1921–30
Rumania	3,764	2.3	730	.44	19.4	1921–30
Italy	6,532	1.9	1,516	.43	23.2	1921–29
Ceylon	808	1.9	111	.27	13.7	1922–30
Japan	8,075	1.4	1,454	.25	18.0	1921–30
France	1,573	1.0	363	.22	23.1	1925–28
The Netherlands	728	.92	23	.03	[7]3.2	1921–30
Scotland	452	.93	26	.05	[7]5.8	1921–30
Finland	137	.44	14	.05	10.2	1921–29
Philippine Islands	318	.39	56	.07	17.6	1924–30
Germany	976	.15	161	.02	16.5	1921–30
Bulgaria	74	.15	14	.03	[10]18.9	1921–30
Austria	39	.07	8	.01	[10]20.4	1921–30
Denmark	32	.09	3	.01	[10]9.4	1921–30
Norway	5	.02	0	.00	[10]0.0	1921–30
Sweden	6	.01	4	.09	[10]66.7	1921–30

[1] Data mainly from Epidemiological Reports of the League of Nations, especially R. E. 155 (Oct. 15, 1931), pp. 400–404.
[2] Data from the National Department of Health.
[3] Data not available.
[4] Estimated rate for malignant type only. See footnote 2, page 368.
[5] Provisional data for portion of India reporting 1926–30.
[6] Data for 35 States reporting during the entire period.
[7] Case fatality has declined appreciably in recent years.
[8] Without Ukraine.
[9] Cases have declined considerably during the latter part of the period.
[10] Rate based on less than 100 cases.

RELATION OF INCIDENCE TO VACCINATION

A review published by the League of Nations (*3a*) gives information concerning vaccination laws in 15 of the countries listed in table 1 as having case rates under five per 100,000 population. In 12 countries, or 80 percent, vaccination is compulsory, and in one half (Yugoslavia, Bulgaria, Rumania, Italy, France, Germany, and Japan) vaccination is required twice or oftener, usually shortly after birth, on admission to school, and at commencement of military service. The three

countries in this low-morbidity class, in which vaccination is not reported as strictly compulsory, are Austria, the Netherlands, and Norway. It is reported, however, that in Austria nearly three-quarters of the population of 7,000,000 were vaccinated or revaccinated in 1916, owing to the spread of virulent smallpox from Russia (*35*); in the Netherlands, the proportion of primary vaccinations to births rose from 77 percent in 1920 to 95 percent in 1926; and in Norway, said to have a hotbed of the antivaccination movement among some religious sects in the southwest districts, roughly two-fifths of the infants are apparently vaccinated, although the proportion of first vaccinations to births each year has varied from 175 percent to 52 percent. I am assured by a representative of the Rockefeller Foundation, familiar with the central European countries, that the vaccination laws are ordinarily enforced there with faithfulness, and that the public, who have known the fear-inspiring malignant variety of smallpox almost exclusively, in the main regard vaccination as a boon and not a burden.

In the nations with intermediate case rates, 12 to 50 per 100,000, we find that, except in Russia, vaccination is not compulsory. In England, only about 45 percent of the infants were being vaccinated in 1925 as against 76 percent in 1905. In the United States, according to unpublished data of S. D. Collins to be cited later, surveys indicate that, roughly, half of the population have at one time or another been vaccinated; according to Woodward and Feemster (*5*) only 10 States have required vaccination; 6 have local option. In Switzerland and Canada local option seems to prevail.

Turning finally to the countries with very high smallpox rates, including India, China, and Mexico, we find that in India inoculation has long been practiced, and that gradually vaccination is being extended, but is far from satisfactory, being in a rudimentary stage at best. In China, vaccination is said to be practiced only in a few places, and there very meagerly. Inoculation is also practiced. Mexico is of especial interest to us. The sanitary code of 1926 prescribed compulsory vaccination at birth, and revaccination every 5 years, but correspondence with a number of sanitarians, cited later, confirms the suspicion engendered by the very high mortality rates that enforcement of the law must, at best, be a matter of gradual extension. At any rate, for the decade shown in table 1, Mexico must be classed as very incompletely vaccinated.

The international reports, incomplete as they are in some places, indicate rather definitely that well-vaccinated countries tend to have low attack rates and vice versa. A glaring exception to the rule occurs in Australia and New Zealand. In these countries, although less than 1 percent of the infants are vaccinated nowadays, smallpox is practically extinct. Australia has reported only five deaths from

smallpox in 10 years. In explanation, a letter from Dr. A. E. Keyes, secretary of the public health department at Melbourne, states:

Australia's freedom from smallpox is due to its isolation. The disease occurs there only when introduced from abroad, and thus far a vigilant medical inspection and quarantine at seaports, and similar vigilance in the interior, have been successful in preventing epidemics during recent years. Nevertheless, the health authorities in Australia are alarmed at the present state of affairs; although they have issued repeated warnings to vaccinate, there is little possibility at this time of a reinstatement of vaccination in the Australian states.

CASE FATALITY IN VARIOUS COUNTRIES

From column 5 of table 1 it is evident that smallpox of case fatality less than 1 percent seems to have been especially prevalent during recent decades in certain English-speaking countries—the United States, Canada, and England. It also reached Switzerland, but practically disappeared by 1926 (table 3). Mild smallpox is also known to be prevalent in certain African areas; in fact, the mild strain is believed by some to have reached America originally from Africa. The mild type appears to be the predominating form in the small amount of smallpox remaining in Spain (*3c*); it has also been observed to varying degrees in other parts of the world, but North America, England, and possibly South Africa seem to be its particular strongholds.

On the other hand, smallpox with high case fatality appears to be the predominating form in India, where case rates are high, as well as in many countries in which the disease has almost disappeared, for example, central Europe and Japan (table 1, col. 5).

In order to inquire into the high case fatality ratio reported for India, and to obtain further information from other foreign areas of interest, letters were sent to various individuals in such countries. A summary of the replies follows:

From Madras, India, Maj. A. M. V. Hesterlow, of the Indian medical service, writes: "Very rarely do we meet with a mild case of smallpox amounting to alastrim. Most of our cases are the severe type, running the usual secondary fever, with lesions which have permanent scars after recovery. The average case mortality was 36.9 percent from 1929–33."

From Delhi, India, Maj. A. J. Chatterji, writes: "In some of the Provinces the case mortality rate has been as high as 40 percent; in others only 13 percent; and in certain urban areas sometimes as low as 5.7 percent has been noticed * * *. It is very difficult to say what proportion of cases are of mild type; but from general experience I may venture to say that they do not far exceed 30 percent of all smallpox cases."

From Colombo, Ceylon, Dr. R. Briercliffe, director of medical and sanitary service, writes: "Variola minor has not so far manifested itself in Ceylon. Ceylon is unusually free from smallpox, but in November 1932 the disease was introduced from India and an epidemic followed * * *. There were 443 cases, of which 78, or 17.6 percent proved fatal." [The writer wishes to acknowledge the courtesy of Dr. W. F. Jacocks, representative of the Rockefeller Foundation at

Colombo, Ceylon, through whose aid much of the information from India and Ceylon was obtained.]

From China, Dr. I-chin Yuan, of the department of public health, Peiping Union Medical College, submits detailed data concerning an outbreak in the Peiping first health district, on the basis of which he concludes that the fatality in a group of 181 cases was about 20 percent. From Nanking, China, Dr. S. C. Hsu, head of the department of vital statistics and epidemiology, central field health station, writes: "According to the opinions of a few authoritative physicians with whom I have consulted, about 60 percent of the cases are of the mild type, while the severe, classical type contributes about 40 percent. The case fatality in hospitals is about 14 percent." Data are not available for the interior of China.

From Brazil, advice (*6*) is received through Drs. Soper, Rogas, and Lins that smallpox is rarely seen in Rio de Janeiro, where vaccination is thoroughly enforced. In the interior of Brazil, where vaccination has not been general, both smallpox and alastrim are seen. In Porto Alegre, with a population of 175,000, a diagnosis of alastrim was made in one of about 1,500 cases of smallpox. The case fatality of smallpox in Brazil is estimated at about 40 to 45 percent, and that of alastrim less than 1 percent.

Mexico.—The smallpox history of Mexico is of particular importance to the United States because, as will be seen later, epidemics of the malignant variety of smallpox have repeatedly been traced to importation from Mexico.

Satisfactory morbidity data are not available for Mexico, but the smallpox death rate, 69.9 per 100,000 population, is the highest of any of the countries shown in table 1. The annual data shown in table 2 indicate an epidemic crest about 1923–24, and again in 1930, when a mortality rate of 105.3 per 100,000 was attained. These high mortalities are evidence of the widespread prevalence of malignant smallpox in Mexico. It is estimated that, during 1922–32, the annual case incidence of the malignant variety alone must have been at least 163 per 100,000 population.[2]

Correspondence with Mexican hygienists (*7*) indicates that the mild virus is also present in Mexico. A table of cases and deaths for

[2] A rough, but conservative, estimate of the attack rate in Mexico from malignant smallpox is made possible by the fact that even if every person were assumed ultimately to contract mild smallpox, the expected deaths could account for only a fraction of the smallpox deaths which actually occur in Mexico The remaining smallpox deaths form a basis for conservatively estimating malignant cases

More specifically, the average lifetime in Mexico after the first few months of age, i e., for the age span most relevant to this problem, is doubtless 35 years or longer. (No life table is available for Mexico. In the United States the mean expectation of life at birth during this period was about 58 years (*17*). The expectation for Hawaiians in Hawaii, a disappearing race, was 29 years, in 1920, for Caucasian-Hawaiians it was 45 years (*18*)) We should expect, therefore, if everyone be assumed to contract mild smallpox eventually, that, on an average, not more than one thirty-fifth of the population would be attacked per year; accordingly, during 1922–32 the number of mild cases would, at most, have been one thirty-fifth of the mean population of 15,300,000, or about 437,000 cases per year. If the case fatality of the mild type is 0.2 percent (*1e*, *2e*) (lower rates are seen in table 3 during some years for Switzerland and England, in spite of possible presence of some malignant cases), the expected deaths among the 437,000 mild cases would be about 874 per year. But, during 1922–32, the reported smallpox deaths actually averaged 10,885 per year (data from table 2); hence an average of at least 10,011 deaths per year, or over 92 percent of all smallpox deaths in Mexico, presumably were of malignant type. Assuming a case fatality of 40 percent for this type, or only 2½ cases per death, the estimated number of malignant cases becomes 25,027, a rate of 163 per 100,000 population or [illegible]

cities in 1932 shows for Irapuato 198 cases without a death, and for Toluca, in the State of Mexico, 222 cases, with only 3 deaths.

TABLE 2.—*Annual smallpox deaths and death rates per 100,000 population in Mexico, 1922–32* [1]

Year	Deaths	Death rates	Year	Deaths	Death rates
1922	11,966	84.4	1928	6,694	42.0
1923	13,074	90.3	1929	11,304	69.6
1924	12,964	87.8	1930	17,405	105.3
1925	11,003	73.1	1931	14,908	88.6
1926	5,477	35.7	1932	8,307	48.5
1927	6,639	42.4	Total, 1922–32	119,796	69.6

[1] Deaths from the National Department of Health of Mexico. Populations: 13,887,000 in 1921; 16,527,000 in 1930. (Populations from League of Nations Epidemiological Reports, January 1927 and January 1932.)

The following excerpts from a letter received from Dr. Francisco DeP. Miranda, chief of the division of interchange at the National Department of Health, throw further light upon the Mexican situation:

As a rule our cities are relatively free from smallpox, especially from severe forms of the disease. Usually the epidemics arise in rural villages inhabited by Indians. The States of Oaxaca and Guerrero may be cited as examples. [These States, in the south of Mexico, have the highest mortality rates (*3d*).] New roads have promoted smallpox control, as these villages used to be isolated, sometimes requiring 5 or 6 days on horseback to reach them.

Mexico City, notwithstanding continual efforts for vaccination, is not yet free from smallpox. The reason is that the Federal district is nearly surrounded by the State of Mexico, with a heavy Indian population scattered in many little villages; and these Indians frequently come to the city to sell their wares.

When an epidemic strikes a village inhabited by a nonimmune population, the disease is likely to be severe, in a confluent and even hemorrhagic form. In Mexico City proper, the last epidemic of severe form was in 1913. Unfortunately, rural health work is still lacking in many communities; to these we have occasionally sent what we call "sanitary brigades" in charge of vaccination, but sometimes these brigades arrive after an epidemic has passed. Full-time sanitary units are now functioning in Vera Cruz, Minatitlan, Puerto Mexico, and Cuernavaca, points which are now free of smallpox.

THE SPREAD OF MILD SMALLPOX

The mild virus of smallpox may be of great antiquity. Mild smallpox was observed by Jenner in Gloucestershire in 1798 (*16*), and the success of inoculation still earlier may have been due to selection of mild virus for transplantation; but the mild form of this disease first attracted general attention after its recognition in Florida in 1896. Its rate of spread in the United States is indicated by the fact that, within 10 years, the case fatality of smallpox in this country was down to about 0.6 percent (*1c*). The mild virus certainly was carried from here to other countries; but it would be unsound to assert that these importations represented first appearances in those countries.

In figure 2 is reflected the growing predominance of mild smallpox in various countries since 1910. The position of each square on the horizontal scale indicates its apparent case fatality at the time. (Names of countries discussed below are underlined, for convenient identification.) We note that during 1910–15 the United States was the only country of those shown in which mild smallpox predominated, the fatality for all cases being about 0.6 percent. In the remaining countries the fatality was at least 10 times this figure.

During the next quinquennium, that of the World War, the situation was not changed, except that in most countries the fatality rose slightly.

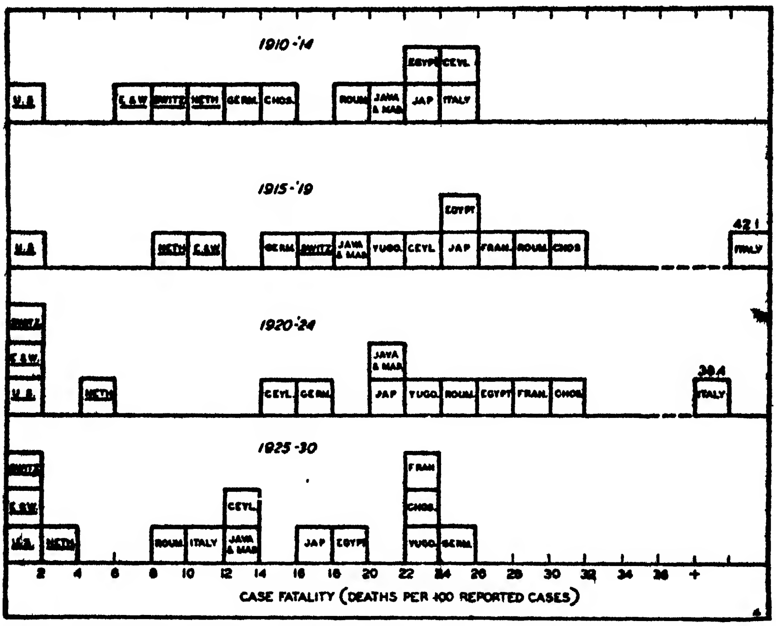

FIGURE 2.—Distribution of certain countries according to smallpox case fatality, during each of four quinquennia, 1910–30.

During 1920–24, the post-war quinquennium, mild smallpox clearly became predominant in England and Switzerland, the fatalities there declining to 1 and 3 percent, respectively. In Switzerland the mild form became heavily epidemic (table 3), but by 1925 was apparently wiped out by a national vaccination campaign (*3e*). In England, however, the incidence rose steadily to the end of the decade, and thereafter declined.

During 1925–30 the Netherlands entered the low fatality zone, with a fatality of 3.2 percent, attributable almost solely to an epidemic in 1929, which was controlled within the year. The case fatality declined markedly in most other European countries, however, which

raises the question whether central Europe, like the United States, Canada, and England, will permit mild smallpox to become endemic.

Figure 2 shows a hiatus on the case fatality scale between 2 percent and about 8 percent, this gap prevailing during each of the four quinquennia. Chapin's earlier data for the United States (*1c*) and data for England in table 3 of this paper show that when the case fatality began to decline, the movement was fairly rapid. This picture is not inconsistent with the prevalent view that (*a*) there are two principal strains or groups of smallpox virus, the one with fatalities distributed about an average of approximately 25 or 30 percent (higher in wholly unvaccinated communities) and the other with fatality considerably below 1 percent; and that (*b*) if there are strains of intermediate fatality, they have failed to establish themselves as successfully as have the very mild or the very severe strains. The crude data here presented, however, scarcely warrant more than raising questions on these points; the final answer must come from information which is far more precise.

ECOLOGY OF SMALLPOX TYPES

It is desirable to inquire why the mild form of smallpox should predominate so overwhelmingly in such countries as the United States and England, whereas the malignant type is still the predominant form in most of the remaining areas, whether smallpox be highly prevalent, as in Mexico or India, or almost extinguished, as in most of continental Europe and Japan. The contrast is especially interesting between Spain, which harbors a small amount of mild smallpox, and Portugal, where the malignant type is widely prevalent (*3f*). Importation *per se* cannot be a sufficient explanation, for mild smallpox is known to have been imported into England in 1902 (*1*), and doubtless into France, Germany, and nearby countries in 1921–25, from Switzerland and South Africa (*3e*); nevertheless, this form did not spread widely at those times. Nor can mass vaccination alone explain the circumstances, for we have seen that malignant smallpox is the predominating type (although rates may be low) in very thoroughly, as well as in incompletely, vaccinated countries.

Nevertheless, one cannot escape the conclusion that importation and especially vaccination do play important roles in determining the picture.

If we accept the prevailing belief that mutation from one strain of smallpox virus into another is at best very rare (*1*, *2*), then it follows, barring selective importation, that the ultimate predominance of one type or the other must depend upon relative dispersibility, or power to spread in the particular area involved. Thus, if, under the prevailing conditions, patients infected with type A produce, for example, 10 percent more new cases than those harboring type B,

TABLE 3.—*Annual cases, deaths, and case fatality ratios (deaths per 100 cases) in various countries [1], 1911–33*

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
United States [2]:																							
Cases	[3] —	—	31,858	32,435	27,252	14,885	45,030	60,792	51,841	85,401	89,357	27,327	24,223	45,255	33,412	25,808	28,498	30,527	35,756	41,782	26,985	7,805	4,959
Deaths	—	—	245	98	200	203	308	373	310	402	481	595	105	814	696	330	113	95	117	132	80	32	25
Case fatality	—	—	0.8	0.3	0.7	1.4	0.7	0.5	0.6	0.5	0.5	2.1	0.4	1.8	2.1	1.3	0.4	0.3	0.3	0.3	0.3	0.4	0.5
England and Wales:																							
Cases	280	121	113	65	93	159	7	63	311	280	336	973	2,504	3,797	5,365	10,146	14,767	12,420	10,968	11,839	5,664	2,039	651
Deaths	23	9	10	4	13	18	3	2	28	30	5	27	7	13	9	18	47	53	39	28	9	3	2
Case fatality	8.0	7.4	8.7	6.2	14.1	11.3	42.8	3.0	9.0	11.7	1.5	2.8	0.3	0.3	0.2	0.2	0.3	0.4	0.4	0.2	0.2	0.1	0.3
Switzerland:																							
Cases	92	21	23	19	4	3	0	2	3	2	596	1,153	2,126	1,234	329	54	0	1	0	1	0	3	0
Deaths	11	3	0	0	2	0	0	0	0	0	7	3	2	2	1	1	0	0	0	0	0	0	0
Case fatality	12.0	14.3	0	0	50.0	—	—	—	—	—	1.2	0.3	0.1	0.2	0.3	1.9	—	—	—	—	—	—	—
Italy:																							
Cases	17,047	13,202	1,414	859	626	641	1,297	4,519	34,363	26,453	4,644	534	495	432	195	112	60	52	8	2	0	0	5
Deaths	4,828	3,336	150	45	19	16	114	924	16,380	11,037	1,360	37	16	46	13	10	5	21	[4] 8	—	—	0	—
Case fatality	28.3	25.3	10.6	5.2	3.0	2.5	8.8	20.4	47.7	41.7	29.3	6.9	3.2	10.6	6.7	8.9	8.3	40.4	—	—	—	—	—
Germany																							
Cases	288	340	90	138	187	685	3,028	413	5,012	2,042	688	215	17	16	24	7	4	2	1	2	0	3	0
Deaths	37	35	12	19	20	91	448	60	704	332	109	26	10	6	9	0	1	0	0	0	0	0	0
Netherlands:																							
Cases	4	7	37	2	7	85	0	0	5	50	1	0	2	3	2	15	0	0	703	2	1	0	0
Deaths	0	1	4	1	1	6	0	0	0	3	0	0	0	0	0	2	0	0	21	0	0	0	0
Rumania																							
Cases	16	70	44	62	103	[3] —	[3] —	[3] —	20,523	3,467	2,744	865	89	9	28	6	4	10	4	5	13	10	—
Deaths	11	10	7	12	58	—	—	—	5,834	781	560	153	11	1	2	1	1	0	1	0	2	0	6
Yugoslavia																							
Cases	[3] —	[3] —	[3] —	[3] —	[3] —	[3] —	[3] —	[3] —	5,278	4,156	2,119	728	1,042	330	14	4	3	0	0	1	—	—	—
Deaths	—	—	—	—	—	—	—	—	1,100	941	483	165	198	64	3	2	0	0	0	0	—	—	—
Total 4 nations:																							
Cases	308	417	171	202	422	770	3,028	414	30,818	9,715	5,552	1,808	1,150	358	68	32	11	12	708	10	14	13	[5] —
Deaths	48	46	23	32	79	99	448	60	7,638	2,057	1,152	344	219	71	14	4	2	0	22	0	2	0	6
Case fatality	[5] —	[5] —	[5] —	[5] —	[5] —	[5] —	[5] —	[5] —	24.8	21.2	20.7	19.0	19.0	19.8	20.6	12.5	18.2	0	3.1	0	14.3	0	—

Egypt:																							
Cases	2,824	1,965	2,934	7,097	5,222	2,972	1,567	1,198	7,896	3,604	92	205	519	799	765	2,676	240	20	26	14	10	[illegible]	[illegible]
Deaths	737	456	705	1,568	1 262	802	409	347	1,938	805	24	90	145	221	158	542	34	4	4	3	0	[illegible]	[illegible]
Case fatality	26.1	23.0	24.1	22.0	24.2	30.4	26.1	25.5	24.4	26.5	23.8	29 1	27 9	27 7	20.7	20.3	14.2	20.0	15 4	—	—	[illegible]	[illegible]
Japan																							
Cases	202	14	108	485	17	264	5,121	1,467	4,056	3,167	889	679	1,922	1,708	430	1,256	352	728	114	7	[illegible]	[illegible]	[illegible]
Deaths	34	1	39	110	3	48	1,158	285	1,115	844	212	124	381	266	81	174	92	115	12	2	[illegible]	[illegible]	[illegible]
Case fatality	16 8	7 1	36.1	22.7	17 6	18.2	22.6	19 4	[4]27 5	26 6	23.8	18.3	19 8	15.6	18.8	13.9	26.1	15.8	10.5	28.6	[illegible]	14.8	[illegible]

[1] Foreign data from Epidemiological Reports of the League of Nations, mainly, R E 155, Oct 15, 1931
[2] Data from the United States are from the States indicated in footnote to table 6
[3] A dash indicates that satisfactory data were not available for the years indicated, in the "case fatality" position the dash means that cases or deaths were too few for calculation of the ratios.
[4] The excess of deaths may relate to cases of the preceding year
[5] Not comparable with the years 1919 et seq as data for Rumania and Yugoslavia were not available for all of the earlier years.

then, ultimately, A must eventually become the predominating type, regardless of the initial distribution.

So far as we know, the factors affecting dispersibility of a disease like smallpox relate primarily to seed, soil, and sowing process; in other words, the virus, the host, and transference. Our problem, then, is to inquire how factors associated with this trio change from place to place, so as to favor the spread of a particular virus.

Turning first to the *virus:* It is generally agreed among observers that, under like conditions, the malignant virus has far greater power to infect exposed persons than has the mild (*2a*, *4c*, *16*, *19a*). The measure of the ability of the virus to spread, e. g., the average number of secondary cases per initial case under standard conditions of immunity, contact, etc., we shall term the *infectivity* of the virus.[8] One reason for the superior infectivity of the malignant virus is its ability to overcome a higher degree of immunity than can the mild. Thus, a person vaccinated 10 years previously may be immune to the mild virus, but not to the malignant. The much larger area of pustules in malignant smallpox perhaps also increases infectivity.

The second factor, *herd immunity*, measures the ability of a population to resist attack upon exposure to smallpox virus of specified potency. As herd immunity rises, apparently a point may be reached where mild smallpox is practically suppressed, and spread of malignant smallpox is inhibited. With greater immunity, even malignant smallpox may be practically suppressed. Immunity is believed to vary with the frequency of vaccination, the potency of vaccine virus, its state of preservation, and probably other factors.

The third factor in determining dispersibility is the *contact rate*, or rate of transference of virus from one person to another. Since malignant smallpox renders the patient less ambulant, and the community enormously more fearsome, the rate of contact with patients must be less for malignant smallpox than for mild. However, since effective isolation demands considerable intelligence and technical knowledge, and is costly, it is reasonable to suppose that the discrimination against malignant smallpox must be commonest and most effective in countries where health organization abounds.

There are doubtless other factors than these three which affect the dispersibility of smallpox; how influential they are can only be surmised.

Although quantitative information is lacking, it seems almost certain that the most important factor in determining which type of smallpox shall predominate in any area is immunity of the population.

[8] Infectivity, as here used (following Stallybrass) (*4*), is not to be confused with dispersibility. Infectivity measures case production under *standard* conditions of immunity, contact, etc.; whereas dispersibility measures production under the *actual* conditions. Therefore, the infectivity of a given strain of virus is presumed to be essentially constant from place to place, but its dispersibility may, and does vary greatly, depending upon immunization and isolation practices, intelligence of the population, and similar factors.

The reason for placing immunity first is that it may vary from almost zero (e. g., universal susceptibility to mild virus) to a high level, where practically all are immune to a very malignant virus. On the other hand, zero infectivity of virus and zero community contact rate are not likely to prevail in any sizable area; even benign smallpox, for example, is considered very "contagious". In other words, while we might find the proportion of immunes to be a hundred times as great in some places as in others, we should scarcely expect to find for contact or infectivity of virus a range of variation as great as five to one; hence we point to herd immunity as the chief of the factors controlling dispersibility of smallpox.

We assume, then, that dispersibility is the resultant of infectivity, contact rate, and susceptibility,[4] and that it varies in rough proportion with each of these factors. We ask next how well this relationship will explain the case fatality in the three types of populations discussed in connection with figure 1.

(*a*) In very well vaccinated countries, such as most of continental Europe, immunity of the population is so high that presumably the mild organism cannot maintain itself. The malignant form, being able to overcome a higher immunity, succeeds in making a feeble stand, and so the small amount of residual smallpox in such countries is expected to be of malignant type. Table 1 shows that recorded fatalities are consistent with this inference, in that countries with low case rates (usually reflecting high vaccination rates) tend to have a high case fatality.

(*b*) At the other extreme, in the very incompletely vaccinated countries, such as China, India, Mexico, and the pre-Jennerian world, the populations were probably not sufficiently skilled or organized to make an effective attack on either variety of smallpox. The malignant virus, therefore, probably encountered susceptibility and contact rates only slightly, if any, lower than did the mild, and therefore tended to predominate because of its greater power to infect and spread.

(*c*) Finally, in the United States and England, with highly organized health forces, the malignant type, where it appears, becomes surrounded with a barrier of immunes through selective vaccination, and the contact rate is reduced through isolation. The mild type, however, is combated far less vigorously; hence it has higher dispersibility and becomes the predominating type.

How greatly the campaign in this country discriminates against malignant smallpox is illustrated by the experience of Detroit. In

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[4] In this and subsequent paragraphs it is assumed that the underlying relationship may be *approximately* represented by the expression $D=isc$, where D represents dispersibility; i, infectivity of virus; s, susceptibility of population; and c, contact rate, respectively.

Susceptibility is here used in place of immunity, because, as is pointed out on page 373, it bears a simpler relationship to dispersibility.

November 1923 when mild smallpox was epidemic, the health department conducted vigorous propaganda for vaccination through the press, motion pictures, and by other means. Nevertheless, the number of health department vaccinations averaged only about 6,000 per month, most of them of children. Shortly afterward, however, when malignant smallpox was imported from Canada, the vaccination rate increased enormously; a half million persons were vaccinated in 1 month, and nearly 800,000 (about 70 percent of the entire population) within 5 months (*13c*).

TABLE 4.—*Smallpox case and death rates per 100,000 population, and percentage case fatality, by States, 1921–31 average*

States	Population 1926	Cases reported, 1921–31	Average annual case rate	Deaths reported, 1921–31	Average annual death rate	Case fatality (deaths per 100 cases)
New England:						
Maine	786, 110	454	5. 25	3	0. 035	0. 66
New Hampshire	456, 751	100	1 99	1	. 020	1. 00
Vermont	356, 850	1, 175	29. 93	6	. 153	. 51
Massachusetts	4, 096, 826	366	81	3	. 007	. 82
Rhode Island	655, 541	112	1. 55	0	----------	----------
Connecticut	1, 519, 879	931	5 57	13	. 078	1. 40
Middle Atlantic:						
New York	11, 740, 819	4, 007	3. 10	9	. 007	. 22
New Jersey	3, 700, 784	970	2. 38	63	. 155	6. 50
Pennsylvania	9, 280, 837	1, 263	1. 24	76	. 074	6. 02
East North Central:						
Ohio	6, 305, 430	36, 771	53 01	168	. 243	. 46
Indiana	3, 119, 996	38, 179	111 24	121	. 353	[illegible]
Illinois	7, 190, 124	28, 342	35 83	132	. 167	. 47
Michigan	4, 390, 824	22, 444	46. 47	321	. 665	1. 43
Wisconsin	2, 820, 953	15, 222	49 05	174	. 561	1. 14
West North Central:						
Minnesota	2, 495, 947	19, 034	69 33	541	1. 970	2. 84
Iowa	2, 445, 199	19, 670	73. 13	124	. 461	. 63
Missouri	3, 542, 727	[1] 11, 103	31 34	[1] 128	. 361	[1] 1. 15
North Dakota	667, 776	5, 743	78 18	13	. 177	. 23
South Dakota	671, 191	8, 847	119 83	20	. 271	. 23
Nebraska	1, 346, 586	12, 798	86. 40	46	. 310	. 36
Kansas	1, 838, 023	18, 797	92 97	145	. 717	. 77
South Atlantic:						
Delaware	232, 465	19	. 74	1	. 039	5. 26
Maryland	1, 561, 569	413	2. 40	2	. 012	. 48
District of Columbia	467, 913	510	9 91	20	. 389	3. 92
Virginia	2, 378, 517	6, 173	23. 59	23	. 088	. 37
West Virginia	1, 615, 549	9, 011	50. 71	21	. 118	. 23
North Carolina	2, 935, 215	19, 962	61. 83	120	. 372	. 60
South Carolina	1, 717, 594	5, 559	29. 48	36	. 190	. 65
Georgia	2, 908, 632	[2] 8, 744	30. 11	[2] 97	. 334	[2] 1. 11
Florida	1, 276, 006	6, 713	47. 83	38	. 270	. 57
East South Central:						
Kentucky	2, 538, 448	[1] 4, 436	[1] 17 48	[1] 64	. 252	[1] 1. 44
Tennessee	2, 509, 377	12, 988	47. 05	48	. 174	. 37
Alabama	2, 531, 600	13, 429	48. 22	108	. 388	. 80
Mississippi	1, 925, 510	8, 100	38. 24	50	. 236	. 62
West South Central:						
Arkansas	1, 815, 144	3, 709	18. 58	25	. 125	. 67
Louisiana	1, 985, 025	7, 089	32. 47	90	. 412	1. 27
Oklahoma	2, 254, 591	17, 703	71. 88	177	. 714	1. 00
Texas	5, 377, 984	[3] 18, 352	34. 12	[3] 140	. 260	[3] . 76
Mountain:						
Montana	541, 947	7, 038	118. 06	18	. 308	. 26
Idaho	439, 966	5, 844	120. 76	20	. 414	. 34
Wyoming	213, 584	1, 747	74. 35	7	. 300	. 40
Colorado	998, 807	6, 517	59. 32	342	3. 114	5. 25
New Mexico	399, 098	848	19. 32	12	. 273	1. 42
Arizona	396, 574	2, 357	54. 04	198	4. 539	8. 40
Utah	485, 366	[3] 6, 813	140. 37	[3] 31	. 639	[3] . 46
Nevada	85, 801	822	87. 06	4	. 424	. 49
Pacific:						
Washington	1, 483, 969	23, 329	142. 92	83	. 509	. 36
Oregon	888, 261	12, 690	129. 87	33	. 338	. 26
California	4, 811, 715	36, 159	68. 35	421	. 795	1. 16

[1] Data not available for the year 1921.
[2] Data not available for the year 1922.
[3] Data not available for the year 1926.

The available statistics for the great majority of geographic areas of the world appear to support the indicated hypothesis; namely, that, both forms being present, and "other factors being equal", the malignant variety tends to be more prevalent than the mild; and that the predominance of the mild type is usually due to inequalities among the "other factors." We have seen that, in England and the United States, a very important biassing factor, though possibly not the sole one, is the selective attack against malignant smallpox. In Spain [8] it is barely possible that importation of mild smallpox from the Balearic and Canary Islands (*10*) may be a factor. Just why mild smallpox should predominate over severe in such areas as South

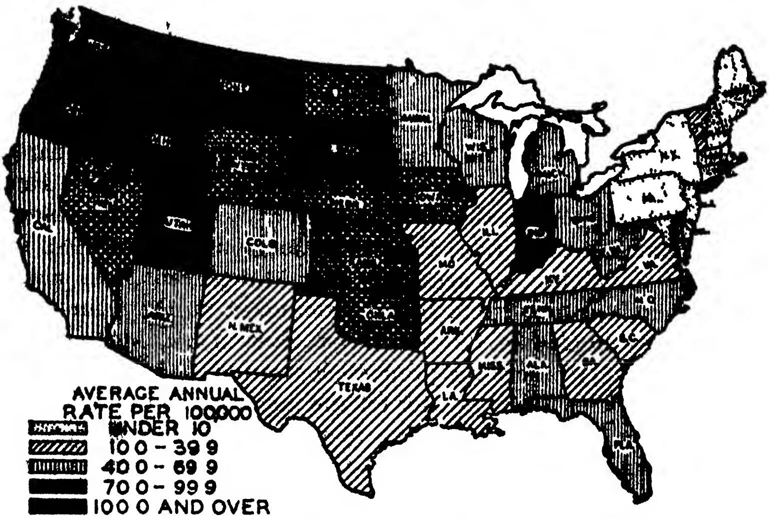

FIGURE 3.—Reported smallpox case rates by States—average, 1921-31

Africa and the West Indies, if it does, is more difficult to say, in the light of the scanty information available. It is, therefore, left to the future to determine whether or not the experience in such areas is consistent with the explanation suggested above, or whether other causative factors must be sought to explain the distribution of mild and malignant smallpox in those areas.

B. Smallpox in the United States

We turn now to a more detailed consideration of smallpox in the United States. In figure 3 and table 4 it is seen that case rates are highest in the northwest and lowest in the northeast regions. The

[8] The low rate in Spain stands in sharp contrast to the high incidence of malignant smallpox in Portugal, at present the smallpox center of Europe. There were, in Portugal, 8,424 cases during 1931-3[illegible], a case rate of about [illegible] per 100,000. The case fatality was 25 2 percent (*3f*). I am informed that vaccination rates there are far lower than in Spain (*4, 9*). Production and distribution of vaccine are also said to be more rigorously supervised in Spain

differences are pronounced, the rates in the Northwest, averaging well over 100 per 100,000, were during 1921–31 more than 40 times as high as the mean rate of 2.6 for the New England and Middle Atlantic States.

When information concerning vaccination in these two regions is examined, apparent contradictions are encountered, whose explanation promises to be instructive of the epidemiology of smallpox. It is doubtless true, as has repeatedly been pointed out, that laws requiring vaccination are far more common in the Northeast; thus, apparently all of the 9 States in the North Atlantic region except Maine and Vermont are said to have required vaccination or local option; whereas only 2 of the 11 westernmost States (Oregon and New Mexico) fall into that class (*5*). But it may, for various reasons, be hazardous to reason from vaccination laws alone; it is desirable to inquire also into actual vaccination rates.

Some very interesting unpublished data from the surveys of the committee on the cost of medical care, furnished to the writer through the courtesy of Dr. S. D. Collins, of the United States Public Health Service, indicate that in the three western States sampled (Colorado, Washington, and California) the proportion found about 1931 to be previously immunized at ages 5–9, viz, 54.9 percent, was actually greater than the proportion found immunized at the same ages in three States sampled in the Northeast (New York, Massachusetts, and Connecticut), where the proportion was but 40.5 percent.[6] The difference is even slightly greater for the population at all ages. The large cities of the sampled areas, however, were found more completely vaccinated in the Northeast than in the West, and the mean age of vaccination was younger.

In discussing this subject, it is more enlightening to speak in terms of susceptibility than immunity, since attack rates have a more direct relationship to susceptibles.[7] Thus, if immunes increase from 80 to 90 percent, the increase in immunes is only one-eighth; but, at the same time, susceptibles decrease by half. The latter ratio clearly measures the expected decline in risk of attack more directly than the former. Therefore, taking as the most available index of susceptibles the population found, about 1931, not previously immunized by vaccination or attack, we note from table 5 that at all ages, surveyed cities of 100,000 population or over, showed, in the West, a proportion of nonimmunized persons of 27.9 percent, which is about 60 percent greater than the proportion found in northeastern large cities (17.8 percent). At ages 5–9, where the relative difference is greatest, the

[6] In the three northeast States, the surveyed sample included a larger proportion of rural families than actually exists in the States. See reference in footnote 1, table 5.

[7] The terms "susceptibility" and "immunity" are here used relatively. The immunity from vaccination falls off progressively at different rates in different persons, and is usually incomplete against severe smallpox within 5 to 20 years if not renewed by revaccination.—Ed.

western large cities had three times the proportion of nonimmunized as the northeastern; at ages 10–14, about twice as many.

These relationships are reversed in the case of smaller cities, towns, and rural areas. Thus, at ages 5–9, the strictly rural parts of the Northeast had about 60 percent more nonimmunized than the West. In New York State vaccination is required for school attendance in large cities, but not for villages and rural territory, except at time of epidemics (*20, 21*). One could hardly assert, upon the evidence just cited, that the comparatively low rates of the Northeast are due solely to vaccination of city populations more completely and at earlier ages. In the discussion of this paper, Dr. Charles Armstrong pointed out that in the Northeast, under the required system, vaccination goes on year after year; whereas in the West, vaccination is oftener undertaken after an epidemic is under way; hence case rates are higher. Other factors than herd immunization, e. g., importation, may also have been operative in producing the contrast between eastern and western case rates. The role of the "other factors" is also emphasized in an official British report (*11a*) in a discussion of geographical distribution of variola minor. The problem clearly merits further study.

TABLE 5.—*Proportions found nonimmunized against smallpox, by types of community and by region, at all ages, and ages 5–9* [1]

Region of the United States	Persons enumerated [2]					Percentage found nonimmunized [3]				
	Cities 100,000 or over	Cities 5,000 to 100,000	Towns under 5,000	Rural	Total, all community types	Cities 100,000 or over	Cities 5,000 to 100,000	Towns under 5,000	Rural	Total, all community types
All ages										
Northeast	2,872	1,819	2,405	1,746	8,842	17.8	62.8	67.6	73.0	51.5
North Central	6,534	3,783	1,861	2,001	14,179	29.0	46.2	47.3	59.8	40.3
South	1,905	2,903	1,115	1,630	7,553	32.4	38.6	43.5	63.3	43.1
West	2,750	996	2,002	1,398	7,146	27.9	36.6	37.5	47.6	35.6
All regions	14,061	9,501	7,383	6,775	37,720	27.0	46.0	50.7	61.5	42.6
Ages 5-9										
Northeast	424	259	343	250	1,276	12.3	72.6	85.1	90.8	59.5
North Central	947	657	361	308	2,273	33.8	56.8	68.4	75.3	51.9
South	306	482	173	227	1,188	26.1	34.0	48.0	65.2	40.0
West	315	116	316	217	964	37.1	44.8	45.3	56.7	45.1
All regions	1,992	1,514	1,193	1,002	5,701	28.3	52.2	64.3	72.9	50.5

[1] These unpublished data are from the survey of the Committee on Costs of Medical Care, in 130 localities of 18 States, during 1928–31. The surveyed areas are described in Causes of Illness in 9,000 Families, Based on Nation-Wide Periodic Canvasses, 1928–31, by S. D. Collins, Pub. Health Rep., 48: 12, pp. 283–308 (Mar. 24, 1933). Reprint 1563.
[2] Enumerated persons with known vaccination status.
[3] Percentage found not to have been vaccinated or attacked by smallpox at any time prior to the survey. (Previous attacks were few in relation to vaccinations. The 2 were, therefore, combined.)

Case fatality changes in the United States.—Figure 4 shows the changes since 1913 in the case fatalities in the United States, and in

each of eight geographic regions thereof. If space permitted, it would be interesting to show in what an amazing proportion of instances even the smaller ripples in the regional case fatality curve can be allocated as to origin by reference to Chapin and Smith's detailed history (*1*). For example, the small peak in the case fatality in the New England region in 1915 was apparently due mainly to an epidemic of 26 cases and 10 deaths in New Bedford, Mass. The first case was reported to be an importation from the Cape Verde Islands. The rise in the Texas-Oklahoma region in 1916 (West South Central) was attributed to frequent importations from Mexico. In 1918 malignant smallpox was carried from Texas to Lake Charles, La., whence it gradually spread to New Orleans and the rest of Louisiana. The small rise for the Pacific region, about 1916–17, was attributed to importation into the Imperial Valley, Calif., from Mexico.

This sensitiveness of the case fatality curve emphasizes the importance of only a few smallpox deaths as a possible indicator of the introduction of the malignant virus into a region.

Many instances similar to those cited show that an important part is played in American smallpox history by the transmission of severe smallpox from place to place. We have in this circumstance a sharp contrast with such diseases as scarlet fever and measles, which are constantly present in the larger cities, and whose epidemic ebb and flow depend not so much upon migration and importation as upon the more or less periodic rise and fall of susceptible populations.

The role of the migrant in spreading malignant smallpox from place to place is strikingly illustrated in the interesting history of the 1922 and 1925 increases in case fatality, which are clearly evident in the graph.[8] In the first of these increases the case fatality rose at least a little in nearly every region of the United States; in the second outbreak three regions were mainly affected.

The first of these outbreaks (1921-22) apparently began in Kansas City and Denver; the second (1924–25) began in Detroit, in various cities in Minnesota, and in New Britain, Conn. These 1924–25 foci were apparently set up by two tramps and a boy, who were infected with malignant smallpox in Winnipeg, Manitoba, in January 1924 and carried the disease to Duluth, Minn., Detroit, Mich., and New Britain, Conn. The resulting epidemic, involving approximately 7,400 cases and 1,270 deaths, was the greatest outbreak of malignant smallpox in this country since 1904. In the writer's opinion, the 1921–22 and 1924–25 epidemics point forcibly to the disastrous effects that ensue when smallpox gains headway in large cities.

[8] Owing partly to the fact that deaths lag after cases, the annual case fatality, as here calculated (annual deaths divided by cases of the same year) is somewhat too low for 1921 and 1924, and too high for the years immediately following.

These great regional epidemics supplement the vaccination surveys referred to above in indicating that national protection from smallpox depends especially upon well-vaccinated cities. Endemically the smallpox death rate in the United States is about two to four times as high in the country as in the city, but the only two wide-spread

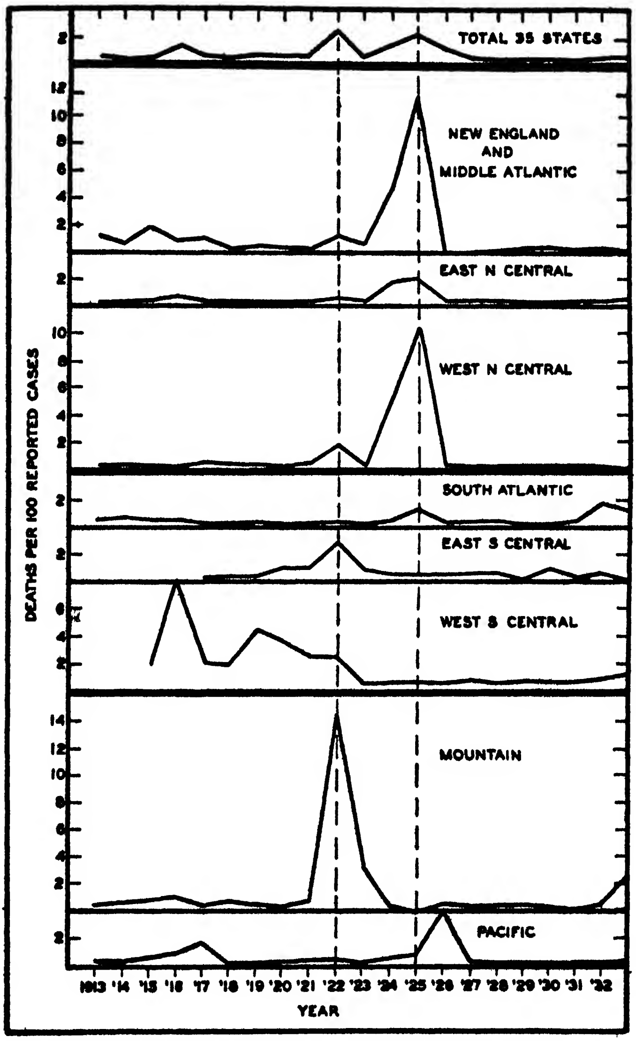

FIGURE 4.—Smallpox case fatality ratios, by U S regions, annually, 1913–33

epidemics of malignant type shown in this graph resulted when outbreaks began in large cities. This is not an argument against rural vaccination; it simply stresses the critical importance of well-vaccinated cities.

TABLE 6.—*Smallpox cases and deaths in each of 8 geographic regions of the United States, annually, 1913 to 1933, inclusive*

Year	New England and Middle Atlantic		East North Central		West North Central		South Atlantic		East South Central		West South Central		Mountain		Pacific		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1913	1,545	22	9,711	19	6,467	16	2,501	10	926	6	3,676	143	3,598	9	3,434	30	31,858	245
1914	1,716	9	13,553	28	7,846	24	4,501	23	—	—	—	—	2,929	8	1,890	6	32,435	98
1915	684	12	9,412	28	7,317	21	1,600	6	775	4	5,780	117	515	3	1,169	9	27,252	200
1916	495	4	5,311	8	4,833	5	565	3	—	—	1,952	164	739	6	900	13	14,885	208
1917	1,873	20	19,010	43	9,340	44	1,362	3	2,166	6	7,758	168	2,680	10	841	14	45,030	308
1918	1,973	3	26,660	78	14,084	48	3,352	9	7,248	32	7,878	161	5,359	35	3,238	7	69,792	373
1919	1,023	5	17,022	37	7,810	17	4,896	17	3,437	13	4,248	190	4,385	15	9,021	14	51,841	310
1920	1,092	3	32,024	65	16,803	32	7,446	20	4,590	52	4,941	185	4,875	10	13,630	35	85,401	402
1921	1,416	3	30,384	89	22,945	104	5,680	19	4,233	48	5,076	125	8,005	58	11,618	35	89,357	481
1922	856	12	8,634	57	5,322	101	1,389	8	1,352	40	2,981	77	1,928	275	4,865	25	27,327	595
1923	1,034	6	8,911	26	3,792	8	1,425	3	615	5	2,951	12	1,010	34	4,485	11	24,223	105
1924	1,364	64	16,468	324	6,012	325	1,666	9	3,105	11	3,343	17	1,068	3	12,220	61	45,255	814
1925	695	81	10,940	227	2,417	246	2,272	32	5,504	26	3,218	19	578	0	7,788	64	33,412	695
1926	376	0	7,677	22	2,481	5	1,676	6	1,924	8	3,946	13	969	5	6,764	272	25,808	330
1927	420	0	10,010	33	3,409	5	2,726	10	1,610	9	4,437	34	1,929	4	3,957	18	28,496	113
1928	652	1	8,467	26	5,126	11	1,944	8	712	4	6,337	30	2,367	7	4,932	8	30,537	95
1929	960	3	14,110	42	6,017	10	1,140	2	415	0	4,880	34	2,366	8	5,868	18	35,756	117
1930	483	2	17,553	51	8,340	12	1,304	3	496	5	5,930	40	1,355	2	6,271	17	41,732	132
1931	910	1	7,804	19	6,230	16	444	2	1,563	2	5,181	32	432	0	3,421	8	25,985	80
1932	593	2	2,066	7	1,872	2	103	2	1,107	7	2,075	20	248	1	1,533	4	9,587	45
1933	36	0	1,190	5	884	0	86	1	127	0	1,310	14	235	6	1,654	5	5,522	31

NOTE.—The 35 States included in this table, their distribution into regions, and regional populations are as follows:

Region	States included	Population	
		1920	1930
New England and Middle Atlantic	Maine,[1] Vermont, Massachusetts, Connecticut, New Jersey, New York, Pennsylvania	28, 614, 573	33, 274, [illegible]
East North Central	Ohio, Indiana, Illinois,[1] Michigan, Wisconsin	21, 475, 543	25, 297, [illegible]
West North Central	Minnesota, Iowa, North Dakota, South Dakota, Kansas	7, 843, 822	8, [illegible]
South Atlantic	Maryland, District of Columbia, Virginia, West Virginia,[1] South Carolina	7, 943, 844	8, [illegible]
East South Central	Alabama, Mississippi	4, 138, 702	4, [illegible]
West South Central	Arkansas,[1] Louisiana,[1] Oklahoma, Texas	10, 242, 224	12, 176, [illegible]
Mountain	Montana, Wyoming, Colorado, Utah	2, 132, 316	2, [illegible]
Pacific	Washington, Oregon, California	5, 566, 871	8, 194, [illegible]
		87, 357, 985	102, 208, 473

[1] States omitted for the years 1913-16, inclusive, because continuous data were not available. For the same reason Alabama, Oklahoma, and Texas are omitted in 1914; Montana and Colorado in 1915; Alabama, Oklahoma, and Utah in 1916, Oklahoma in 1918, Texas in 1919; Oklahoma and Utah in 1920, and Utah in 1922, 1924, 1932

Table 7.—*Smallpox case and death rates per 100,000 population, and percentage case fatality in each of 8 regions*[1] *of the United States, annually, 1913–1933*

Year	New England and Middle Atlantic			East North Central			West North Central		
	Case rate	Death rate	Case fatality	Case rate	Death rate	Case fatality	Case rate	Death rate	Case fatality
1913	6.09	0.067	1.428	72.48	0.142	0.196	95.37	0.236	0.247
1914	6.66	.035	.524	99.34	.205	.207	114.63	.351	.306
1915	2.62	.046	1.754	116.20	.334	.286	119.82	.304	.254
1916	1.87	.015	.808	76.05	.079	.708	78.54	.072	.606
1917	6.77	.072	1.067	92.08	.208	.226	121.84	.574	.471
1918	7.04	.011	.152	127.09	.372	.293	182.08	.620	.341
1919	3.60	.018	.489	79.88	.183	.229	100.02	.218	.218
1920	3.82	.010	.275	149.12	.303	.203	214.22	.408	.190
1921	4.87	.010	.212	138.95	.407	.293	290.83	1.318	.453
1922	2.89	.041	1.401	38.79	.256	.660	67.07	1.273	1.898
1923	3.44	.020	.580	39.34	.115	.292	47.51	.100	.211
1924	4.47	.210	4.692	71.47	1.406	1.967	74.90	4.049	5.405
1925	2.24	.261	11.655	46.68	.969	2.075	29.94	3.047	10.178
1926	1.19	—	—	32.22	.092	.287	30.56	.062	.202
1927	1.31	—	—	41.33	.136	.330	41.76	.061	.147
1928	2.01	.003	.153	34.40	.106	.307	62.44	.134	.215
1929	2.92	.009	.313	56.43	.168	.298	72.80	.121	.166
1930	1.45	.006	.414	69.12	.201	.291	100.47	.145	.144
1931	2.70	.003	.109	30.50	.074	.243	74.86	.192	.257
1932	1.74	.006	.337	8.02	.029	.339	22.45	.024	.107
1933	.10	0	—	4.59	.019	.420	10.58	0	—

Year	South Atlantic			East South Central			West South Central		
	Case rate	Death rate	Case fatality	Case rate	Death rate	Case fatality	Case rate	Death rate	Case fatality
1913	46.08	0.184	0.400	41.95	0.272	0.648	61.99	2.412	3.890
1914	81.88	.418	.511	—	—	—	—	—	—
1915	28.76	.108	.375	34.43	.178	.516	93.77	1.898	2.024
1916	10.02	.053	.531	69.09	—	—	44.50	3.738	8.402
1917	19.16	.042	.220	53.01	.147	.277	78.63	1.703	2.166
1918	46.54	.125	.268	176.46	.779	.442	97.91	2.001	2.044
1919	67.09	.233	.347	83.25	.315	.378	76.65	3.427	4.473
1920	101.81	.273	.269	110.90	1.256	1.133	60.15	2.252	3.744
1921	76.91	.257	.335	100.98	1.145	1.134	48.62	1.197	2.462
1922	18.63	.107	.576	31.85	.942	2.959	28.02	.724	2.583
1923	18.93	.040	.211	14.31	.116	.813	27.28	.111	.407
1924	21.92	.118	.540	71.36	.253	.354	30.29	.154	.509
1925	29.62	.417	1.408	124.98	.590	.472	28.64	.169	.590
1926	21.65	.078	.358	43.17	.179	.416	34.51	.105	.304
1927	34.89	.128	.367	35.70	.200	.559	38.15	.292	.766
1928	24.66	.101	.412	15.60	.088	.562	53.57	.254	.473
1929	14.33	.025	.175	8.99	—	—	40.57	.283	.697
1930	16.25	.037	.230	10.62	.107	1.008	48.50	.327	.675
1931	5.51	.025	.450	33.29	.043	.128	42.04	.260	.618
1932	1.27	.025	1.941	23.46	.147	.632	16.72	.158	.964
1933	1.06	.013	1.163	2.68	0	—	10.49	.112	1.069

Year	Mountain			Pacific			Total		
	Case rate	Death rate	Case fatality	Case rate	Death rate	Case fatality	Case rate	Death rate	Case fatality
1913	195.64	0.489	0.250	73.91	0.430	0.582	48.56	0.373	0.769
1914	155.45	.425	.273	39.47	.125	.317	55.53	.168	.302
1915	87.87	.512	.583	23.71	.183	.770	41.41	.304	.734
1916	47.60	.386	.812	19.52	.256	1.312	23.39	.319	1.364
1917	132.70	.495	.373	16.13	.269	1.665	53.44	.366	.684
1918	259.56	1.695	.653	60.47	.131	.216	83.55	.447	.534
1919	207.84	.711	.342	164.14	.255	.155	63.13	.378	.598
1920	289.68	.594	.205	244.84	.629	.257	100.65	.474	.471
1921	372.29	2.697	.725	199.06	.600	.301	100.57	.541	.538
1922	112.96	16.113	14.263	79.68	.409	.514	30.39	.662	2.177
1923	46.20	1.555	3.366	70.35	.173	.245	26.36	.114	.433
1924	61.72	.173	.281	184.04	.918	.499	48.68	.876	1.799
1925	26.01	—	—	112.64	.926	.822	35.19	.732	2.080
1926	42.82	.223	.521	94.16	3.786	4.021	26.74	.342	1.279
1927	85.44	.177	.207	53.09	.242	.455	29.06	.115	.397
1928	104.02	.308	.296	63.73	.104	.163	30.67	.095	.311
1929	103.16	.349	.338	73.42	.225	.307	35.38	.116	.327
1930	58.62	.087	.148	75.90	.206	.271	40.68	.129	.316
1931	18.62	—	—	40.76	.095	.234	25.12	.077	.308
1932	13.67	.055	.403	17.91	.047	.263	9.25	.043	.469
1933	10.06	.256	2.553	19.13	.058	.302	5.26	.030	.561

[1] The States included in the several regions are shown in table 6.

THE TRANSIENT AND VAGRANT AS SPREADERS OF SMALLPOX

Table 8, which is compiled from Chapin's study, lists the types of persons reported by him to have imported malignant smallpox into the United States. It is to be noted that, of about 20 individuals referred to, there were only 2 boys and 1 woman; the others were men. Note also the representation with respect to social and economic groups, especially in the later years—Mexican bootleggers, migratory laborers, sailors, and persons of similar transient groups. The Detroit epidemic and also an outbreak of malignant smallpox in Poteau, Okla., reported by Parran (*19b*), began with wanderers who came into the hands of the police. In reading the literature one is impressed with the number of outbreaks which began with tramps. Possibly one of the reasons that an epidemic in a large city becomes a menace to the entire nation is the astonishingly large number of homeless men passing through the large cities—vagrants, migratory laborers, and the like. Information on this point is scanty, but several books on the vagrant problem in Chicago agree in indicating that, during hard times, especially in the winter, the vagrant population of that city may become as large as 150,000 (*14*)—over 10 percent of the entire male population of the city of working age. This vast, restless horde, ever on the move, doubtless are very influential in the spread of epidemics.

TABLE 8.—*Types of persons transporting malignant smallpox*

Year	Place of epidemic	Type of person and origin
1900	Winnipeg, Manitoba	Traveler from Japan; infected before reaching Canada
1901	Newark, N. J.	Peddler from New York City.
1903	Crook County, Oregon	Farmer traveling across the country.
1904	St. Louis, Mo.	Filipinos coming to St Louis Exposition.
1907	Fall River, Mass.	Women arriving from England.
1909	Norfolk, Va.	3 cases in sailors from warship just arrived from abroad.
1913	Berkeley, Calif.	A man suspected of having been in Mexico.
1914	Elm Springs, Ark.	Boy, after 9 days' trip from Tampico, Mexico.
1915	New Bedford, Mass.	Sailor from Cape Verde Islands.
1916	Worcester, Mass., and Eveleth, Minn.	Immigrant from Sweden.
1921	Poteau, Okla.	Man who had come from Kansas City and was jailed in Poteau, and five prisoners escaped from the Poteau jail.
1924	Duluth, Minn.	Migratory laborer from Canada.
	Detroit, Mich.	Do.
	New Britain, Conn.	Boy traveling through Canada.
1926	Los Angeles, Calif.	Mexican bootleggers.

Figure 5 and table 9, showing smallpox case rates by age and sex in the Detroit epidemic of malignant smallpox, give further description of the type of individual who is especially subject to smallpox. Note the excessive case rate among the young adult males, ages 15 to 30. The graph also reflects the protection enjoyed by children of school age, when vaccination immunity is at its best.

Figure 6 is presented to illustrate several points, the first of which is the tendency of the smallpox incidence to rise and fall somewhat synchronously in different areas of the United States. It should be emphasized that this picture reflects mainly the movement of mild smallpox. The severe malignant form has, during the last two decades, never contributed as much as 10 percent of the total incidence of the United States, even during the 1921 and 1924 epidemics of malignant smallpox (*1c*). Note the tendency toward a peak in most regions in 1920, and again in 1924 and in 1930. Attention is especially directed toward the decline in almost all regions since 1930, i. e., a period of industrial depression. Similar declines have taken place during the depression in England, Canada, and Mexico. It is interesting to note that fairly general declines also took place in the United States during the industrial depression of 1921–22.

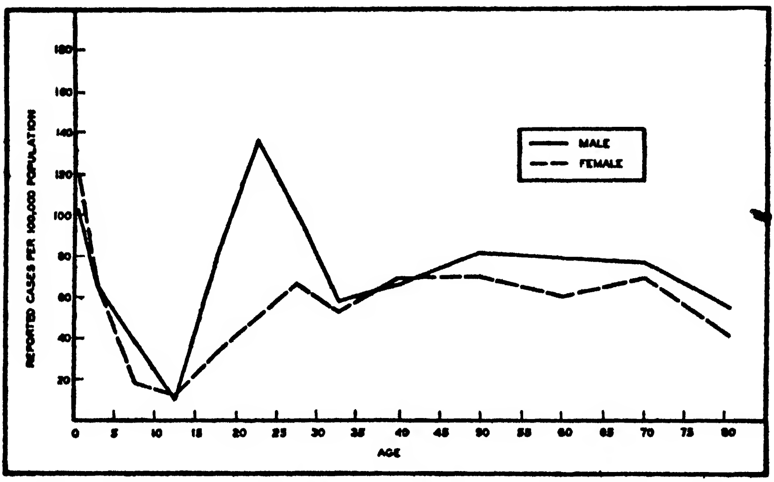

FIGURE 5.—Reported smallpox case rates by age-sex. Detroit, Mich.; 1924 epidemic.

Conversely, the rates tended to rise somewhat during the preceding periods of prosperity. It seems possible that the increases during prosperous periods reflect such forces as the movement of Negroes from the rural regions of the South into the industrial centers of the North and the importation of Mexican labor. Conversely, during periods of depression the movement tends to be from the city back to the farm; and Mexican laborers return to the mother country. A bulletin of the Department of Agriculture (*15*) indicates that, in 1933 or early 1934, the farm population of the United States had reached its all time peak. Opposed to the hypothesis that a rise and fall of smallpox reflects corresponding movements of migratory labor are the reports that the freight trains were never so loaded with migrants as during the depression. It seems possible, however, that these

migrants were mainly city people, who are usually vaccinated; whereas the prosperity migrations from rural regions consist more largely of unvaccinated persons.

TABLE 9.—*Smallpox case rates by age and sex, Detroit, Mich., Apr. 13, to Aug. 31, 1924*

Age	Estimated population [1]		Reported cases [2]		Case rate per 100,000 population [3]	
	Male	Female	Male	Female	Male	Female
All ages	663,902	582,194	472	313	71	54
Under 1	12,647	12,367	13	15	103	121
1-4	51,911	50,334	34	32	66	64
5-9	57,766	56,788	22	11	38	19
10-14	48,510	48,541	5	6	10	12
15-19	45,864	47,526	33	19	72	34
20-24	66,151	61,826	91	31	138	50
25-29	81,563	66,917	66	45	81	67
30-34	74,563	57,740	43	31	58	54
35-44	118,552	86,663	79	61	67	70
45-54	62,554	49,034	52	35	83	71
55-64	28,225	26,676	23	16	82	60
65-74	11,442	12,794	9	9	79	70
75+	8,526	4,676	2	2	57	48
Unknown	628	312	—	—	—	—

[1] Arithmetic interpolation between 1920 and 1930 censuses.
[2] Read from graph on p. 10 of Monthly Bulletin, Detroit Department of Health, April-May 1925, vol. VIII, no. 3.
[3] Rates are not on an annual basis but relate to the indicated period of about 3½ months.

Table 10, which again is taken from Chapin and Smith's data, shows that of 23 importations of malignant smallpox into the United States since 1915, 14, or 61 percent, were from Mexico. This raises the question whether with the return of prosperity and possible consequent smuggling of Mexican labor into the United States, we shall not again be confronted with an increase in malignant smallpox. Certainly the greatest vigilance in this respect is called for. Importation from Asia, some of it through Canada, ranks second in importance.

TABLE 10.—*Foreign sources of traced importations of malignant smallpox into United States, 1915–29*

Foreign sources	Smallpox importations
Mexico	14
Canada	3
Asia	2
Europe	1
Africa	1
Not specified	2
Total	23

There is some danger that the low incidence of the last few years, with possible laxity as to vaccination, may permit a highly susceptible population to develop, ready to be attacked when the move-

ments from farms and from Mexico and the Orient—particularly of smuggled labor—are resumed. In Europe, the chief source of danger is Portugal.

WARNING SIGNALS IN SMALLPOX

From the administrative standpoint, the interest of the health officer and epidemiologist in smallpox must center particularly in the

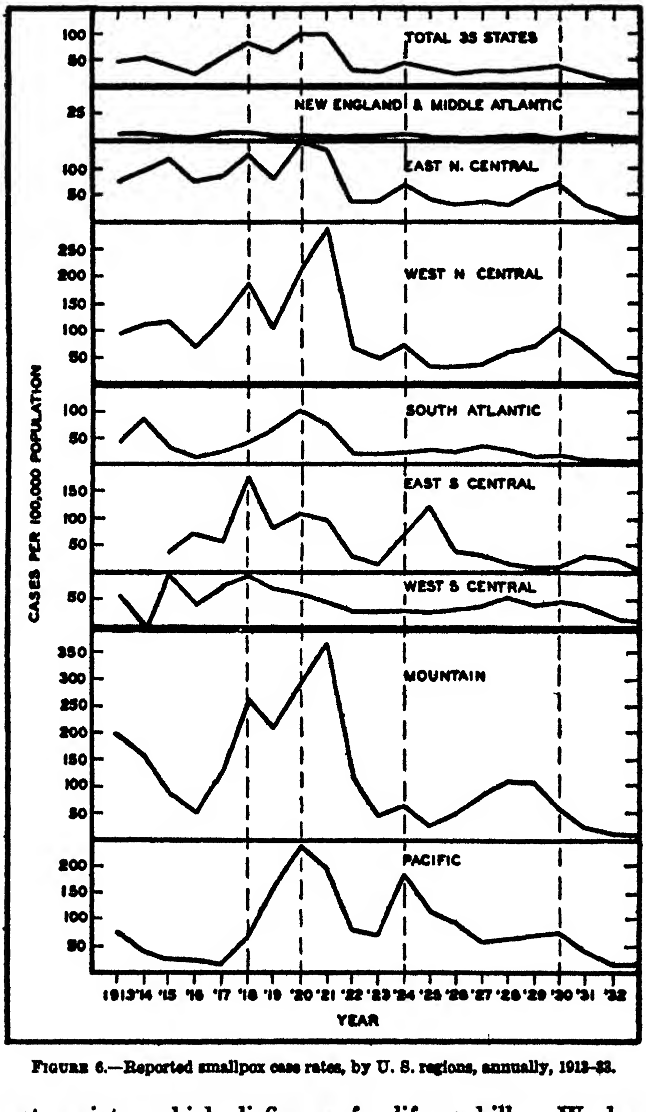

FIGURE 6.—Reported smallpox case rates, by U. S. regions, annually, 1913–32.

malignant variety, which disfigures for life or kills. We have seen that apparently from a single focus of this type in Winnipeg, Manitoba, there resulted 7,400 cases and 1,270 deaths, scattered in many places

throughout the United States. The occurrence of only one case, or a few malignant cases, especially in a large city, should, therefore, be of concern to health officials in many other communities.

It is, however, difficult to obtain current statistics of sporadic cases, or beginning epidemics of the malignant type. There are two main obstacles. The first is that initial cases of malignant smallpox in a community are frequently misdiagnosed by physicians as scarlet fever, measles, or other disease. Thus, in Duluth, the first case was admitted to a surgical hospital because of backache and general pains following an accident (*22a*); in Minneapolis, a hospital orderly apparently died of unrecognized hemorrhagic smallpox after an illness of 3 days (*22b*); in Detroit, the existence of the initial malignant case was not known until the epidemic of severe smallpox was well under way, and one of the early cases died under treatment for measles (*13b*).

A second obstacle to the scientific study and prevention of malignant smallpox is that, since the malignant and mild varieties are reported under the same name, the few malignant cases are concealed in the published statistical reports among the many cases of mild type. The difficulty of obtaining even the crudest quantitative notion as to the nonepidemic prevalence of malignant smallpox can be appreciated only by one who has seriously attempted the task.

For the present, smallpox deaths probably constitute the best available statistical index to local increases in malignant smallpox. It is of interest in this connection that Assistant Surgeon General R. C. Williams, in charge of the Division of Sanitary Reports and Statistics of the Public Health Service, has arranged to publish in the Public Health Reports weekly smallpox deaths for cities. The deaths will be recorded as footnotes to the case reports. In using such a table, it is well to remember that in recent years, less than a hundred smallpox deaths have been reported annually in the United States. Obviously the report of as few as 2 smallpox deaths within a few weeks from a State or city should be cause for suspecting the presence of the malignant smallpox virus, unless there are 200 or more cases per death.

The 1929 International Conference on Causes of Death recommended that smallpox deaths be classified under (*a*) variola vera, (*b*) variola minor, including alastrim, and (*c*) variety unstated. In England the medical practitioner simply reports a death as smallpox; the health department epidemiologist makes the differential diagnosis from clinical and epidemiological data. The procedure is regarded in England as practicable and useful (*11b*).

In the absence of such classification it is impossible to say from case and death reports whether, during the last few years, there has been a single case of malignant smallpox in the United States. It is to be repeated, however, that the importance of the smallpox problem must

not be gaged by the present small number of deaths, but by the probable results when, with the resumption of migration from Mexico and elsewhere, the virus of malignant smallpox begins to be reimported into a population as susceptible as ours. The lesson taught by the 1924–25 epidemic should not be forgotten.

In conclusion, there is, on behalf of scientific study and control of smallpox, and rational attitudes toward vaccination, need of more extensive and continuous knowledge of the immunity status of the population in different places. The exact mode of measurement is a matter for future research; but even so crude an index as the annual rate of vaccination in the different areas would be of distinct value.

Summary

The inferences of this paper are that—

(1) The predominance of the mild virus of smallpox in the United States and certain other countries during recent years is probably due primarily (*a*) to relatively low endemic vaccination rates, which permit the mild strain to maintain itself; and (*b*) to a more intense attack against the malignant form. Other factors may, however, have played an important part.

(2) High vaccination rates are particularly important for large cities, if national protection against malignant smallpox is to be maintained.

(3) The vagrant, migratory laborer, and people from unvaccinated rural regions have been influential in the spread of smallpox from place to place.

(4) There are indications that the smallpox incidence has increased during times of prosperity through intensified migration to industrial centers from rural areas, where vaccination rates are relatively low and attack rates endemically are higher than in cities. Conversely, during recent industrial depressions the smallpox incidence has declined.

(5) Particular vigilance is required to forestall the importation of the virus of malignant smallpox into the United States from Mexico, and in lesser degree from the Asiatic ports, if immigration, including smuggled labor from these sources, should be resumed with the return of prosperity.

(6) Smallpox deaths or case fatality ratios at present probably represent the best available index of malignant smallpox. The prompt publication of smallpox deaths in conjunction with cases is highly important.

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(7) Letter from Dr. Salvador Bermudez, professor of hygiene at the faculty of medicine, Mexico City, and Dr. Francisco de P. Mirando, chief of the division of interchange, Federal Department of Health. (I am indebted to Dr. C. A. Bailey, representative of the Rockefeller Foundation at Mexico City, and to Dr. R. K. Collins and Dr. H. P. Carr, for cooperation in this connection.)
(8) Statements of Drs. J. Moroder and I. Medarde, both in the national health service of Spain.
(9) Statements of Drs. C. H. D'Oliveira and F. N. Araujo, of the national health administration of Portugal.
(10) Estimate for the Canaries and Balearics in the difference between the League of Nations data, which include those islands, and the data for Continental Spain from the Bulletin Semestral of the Departmento National de Estadisticas, forwarded through courtesy of Dr. Manuel Pascua. Acknowledgment is also due to Dr. R. B. Hill, representative of the Rockefeller Foundation in Spain, in this connection.
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ACUTE RESPONSE OF GUINEA PIGS TO VAPORS OF SOME NEW COMMERCIAL ORGANIC COMPOUNDS

IX. PENTANONE (METHYL PROPYL KETONE) [1]

By W. P. Yant [2], F. A. Patty [3], and H. H. Schrenk [4]

This report on the acute response of guinea pigs to pentanone (methyl propyl ketone) vapor is the ninth of a series of similar reports [5] which deal with studies pertinent to establishing a criterion of toxicity of the vapor of some chemical products which have recently reached or promise to reach important domestic or industrial use.

The investigation was undertaken at the request of Stanco, Inc., and was conducted jointly by the United States Bureau of Mines and that company. The experiments were conducted by the Bureau of Mines at its Pittsburgh Experiment Station.

SCOPE OF WORK

The scope of the work included a study of the toxicity and physiological response of guinea pigs exposed to vapors of pentanone (methyl propyl ketone). Only the acute effects as produced by a single

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[5] Acute response of guinea pigs to vapors of some new commercial organic compounds:

I. Ethylene dichloride. Sayers, R. R., Yant, W. P., Waite, C. P., and Patty, F. A. Pub. Health Rep., vol. 45, no. 5, Jan. 31, 1930, pp. 225-239. (Reprint No. 1349.)

II. Ethyl benzene. Yant, W. P., Schrenk, H. H., Waite, C. P., and Patty, F. A. Pub. Health Rep., vol. 45, no. 22, May 30, 1930, pp. 1241-1250. (Reprint No. 1379.)

III. Cellosolve. Waite, C. P., Patty, F. A., and Yant, W. P. Pub. Health Rep., vol. 45, no. 26, June 27, 1930, pp. 1459-1466. (Reprint No. 1389.)

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V. Vinyl chloride. Patty, F. A., Yant, W. P., and Waite, C. P. Pub. Health Rep., vol. 45, no. 34, Aug. 22, 1930, pp. 1963-1971. (Reprint No. 1405.)

VI. Dioxan. Yant, W. P., Schrenk, H. H., Waite, C. P., and Patty, F. A. Pub. Health Rep., vol. 45, no. 35, Aug. 29, 1930, pp. 2023-2032. (Reprint No. 1407.)

VII. Dichloroethyl ether. Schrenk, H. H., Patty, F. A., and Yant, W. P. Pub. Health Rep., vol. 48, no. 46, Nov. 17, 1933, pp. 1389-1398. (Reprint No. 1602.)

VIII. Butanone. Patty, F. A., Schrenk, H. H., and Yant, W. P. Pub. Health Rep., vol. 50, no. 36, Sept. 6, 1935, pp. 1217-1228. (Reprint No. 1702.)

exposure were studied. The experiments were planned to cover a range of concentrations which would produce but slight or no response, moderate response, and serious response.

CHEMICAL AND PHYSICAL PROPERTIES

The pentanone used in this study was a commercial grade of methyl propyl ketone sold for industrial use. It was water-clear and had an odor resembling that of acetone, but tended to be more ethereal in character. An examination of the material gave the following values for the physical properties:

Specific gravity

15.6°/15.6° C	0.8115
20°/15.6° C	.8075

Boiling range

Distillate, cumulative (percent)	Temperature, ° C, corrected to 760 mm	Distillate, cumulative (percent)	Temperature, ° C, corrected to 760 mm
Initial boiling point	98 5	60	101 7
1	99 0	70	102.0
2 8	99 5	80	102.4
5	99 9	90	103 0
10	100 4	95	103 4
20	100 8	97 2	104 4
30	101 2	98	105 2
40	101 3	99	106 5
50	101 5	99 7	109 0

Recovery, 99 7; residue, 0 1 percent, lost, 0 2 percent.

These values of the physical properties as determined by the Bureau of Mines agree closely with the specifications furnished by the manufacturer for this commercial product. The manufacturer also specified the product to be 88.7 percent ketone as determined by acetylation.

The boiling point of pentanone as given in the International Critical Tables [6] is 101.7° C.

SUGGESTED USES OF PENTANONE [7]

Pentanone is an organic solvent. It is reported to be a good solvent for nitrocellulose and Vinilite products and has possibilities of use in making lacquers and also varnish and lacquer removers.

TEST APPARATUS

The apparatus for preparing pentanone-air mixtures and for exposing animals was the same as that described in a previous report dealing with butanone.[8]

[6] International Critical Tables, first edition, 1926, vol 1, p 192

[7] These suggestions are given to acquaint persons interested in industrial hygiene with the probable fields of use of this product. The Bureau of Mines has done no work on the use of this product, and the above suggestions are not intended to be complete.

[8] See footnote 5

COMPUTATION AND ANALYSIS OF VAPOR-AIR MIXTURES

The method of computation and analysis was the same as that described in the report on butanone.[5] Table 1 gives the results of analyses of a standard aqueous solution of pentanone made to check the accuracy of the method of analysis.

TABLE 1.—*Results of the analysis of samples containing known amounts of pentanone*

Pentanone taken	Pentanone recovered	Recovery
Milligrams	*Milligrams*	*Percent*
16.2	16.85	104
32.4	34.4	106
32.4	34.4	106
48.6	51.5	106

As an average recovery of 106 percent was obtained (table 1) for known amounts of the standard solution of commercial pentanone, the values obtained for the amount of pentanone in the vapor-air mixtures used in animal experiments (table 2) were corrected by multiplying the determined value by 100/106, or 0.943. The high-percentage recovery probably is due to some secondary reaction, as discussed in the paper on butanone.[5]

Table 2 gives the results of the concentration computed from the volume of air and amount of pentanone vaporized, and the concentrations found by chemical analysis of vapor-air mixtures used in animal experiments. The calculation of percent by volume was made on the basis that 1 gram molecular weight of pentanone is equivalent to 22.4 liters of vapor at 0° C. and 760 mm mercury pressure.

TABLE 2.—*Results of analysis of exposure atmospheres*[1]

Concentration by—		Concentration by—	
Computation	Analysis	Computation	Analysis
(2)	[3] 4.7	0.47	0.46
(2)	[4] 4.6	0.48	.47
(2)	[4] 5.7	0.45	.44
	[4] 5.7	0.17	.16
1.4	1.2	0.15	.16
1.3	1.3	0.15	.16
1.4	1.4	0.14	.14
1.4	1.2	0.15	.14
0.51	.53	0.15	.17
0.46	.56		

[1] Concentration in percent by volume at 25° C. and 760 mm pressure. To convert to mg per liter, multiply by 35.2.
[2] Concentration obtained by recirculating air at 30° C. and 740 mm pressure across wicks wet with liquid pentanone. No computed concentration.
[3] Obtained by slow combustion analysis.
[4] Obtained by adsorption on air-equilibrated charcoal.

The maximum concentration attainable by recirculating air at 30° C. and 740 mm pressure over large-surface wicks wet with pentanone averaged approximately 5 percent. The remainder of the re-

[5] See footnote 5.

sults in table 2 represent experimental atmospheres prepared by continuously volatilizing a measured amount of pentanone in a measured volume of air, the number of air changes in the experimental chamber being two to three per hour. Tests have shown that this rate of change in the apparatus used is ample to prevent oxygen deficiency or significant increase in carbon dioxide. The general order of concentrations used in the experiment were 5.0, 1.3, 0.5, and 0.15 percent by volume.

TEST PROCEDURE; DESCRIPTION AND CARE OF ANIMALS

The test procedure and description and care of animals were the same as those described in a previous report of experiments with butanone.[3]

RESULTS OF TEST

This report presents summarized results pertinent to signs or symptoms, fatality, and gross pathology.

OBJECTIVE SYMPTOMS

Control animals.—No signs or symptoms were exhibited by the 24 control guinea pigs taken at random from the stock animals used in these tests. No deaths occurred.

Exposed animals.—The signs or symptoms exhibited by animals exposed to pentanone vapor in the order of their occurrence were as follows: Irritation of the nose and eyes, manifested by rubbing nose with the forepaws and squinting; lacrimation; incoordination; narcosis; gasping type of respiration; and death. Table 3 gives the average period necessary to produce these symptoms by various concentrations of pentanone vapor in air. The figures given in parentheses indicate that the particular symptom did not occur in the maximum period of exposure as given, whereas the other values indicate the average time for occurrence of the symptom.

TABLE 3.—*Signs and symptoms produced in guinea pigs exposed to vapors of pentanone*

Type of symptom	Concentration of vapor, percent by volume			
	5	1.3	0.5	0.15
	Duration of exposure (minutes)			
Nasal irritation (rubbing nose)	(1)	2	3	[2] (810)
Eye irritation (squinting)	(1)	2	3	[2] (810)
Lacrimation	(1)	2	5	[2] (810)
Incoordination	2	17	270	[2] (810)
Narcosis (unconsciousness)	6	47	460–710	[2] (810)
Respiratory changes (dyspnea, gasping)	30	150–270	570–710	[2] (810)
Death	50	300	[2] (810)	[2] (810)

[1] Occurred almost immediately after start of exposure.
[2] Not observed during the maximum exposure time as given in parentheses.

[3] See footnote 5.

No abnormal signs were observed during or following an exposure to 0.15 percent pentanone vapor in air by volume for 810 minutes. With exposure to 0.5 percent in air, signs of irritation of the nose and eyes occurred in 3 minutes, lacrimation in 5 minutes, incoordination in 270 minutes, and unconsciousness in 460 to 710 minutes, closely followed by dyspnea, but no deaths occurred during or following an exposure of 810 minutes. The time for occurrence of these symptoms decreased rapidly with increases in concentration,

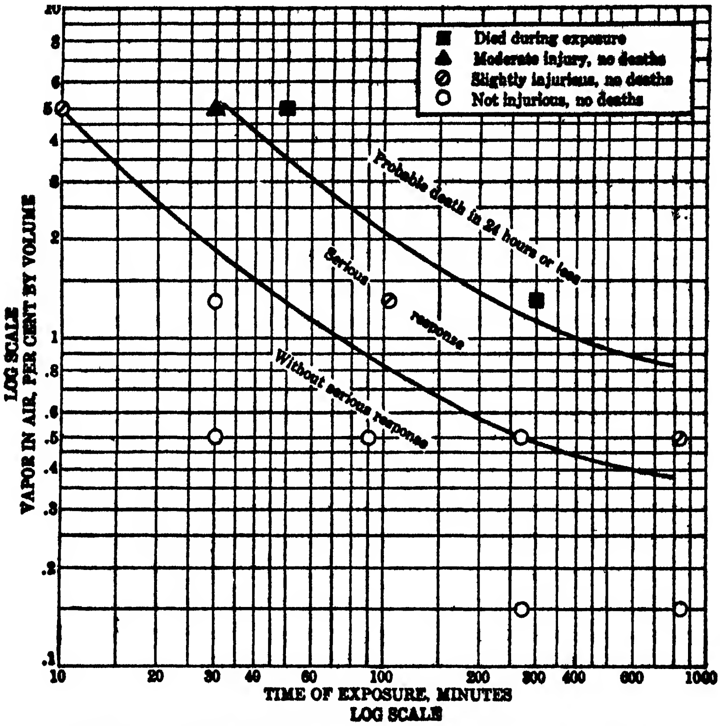

FIGURE 1.—Acute effects of exposure of guinea pigs to pentanone vapor in air.

and death was produced by an exposure to 1.3 and 5 percent vapor in air for 300 and 50 minutes, respectively.

GROSS PATHOLOGY

Control animals.—The 24 control animals killed for autopsy exhibited no significant gross pathology.

Exposed animals.—The gross pathological findings in animals that died during exposure (see table 3 and fig. 1) were slight congestion of the brain and marked congestion of the systemic organs. The lungs were emphysematous, edematous, and markedly congested. Exposure to conditions that caused marked incoordination, narcosis,

and a gasping-type respiration produced slight or no congestion of the brain and slight to moderate congestion of lungs, liver, and kidneys in animals killed immediately after exposure. These findings were absent in nearly all animals killed for autopsy 4 to 8 days following exposure. No gross pathology was found in animals exposed for 30, 90, and 270 minutes to 0.5 percent or exposure of 270 and 810 minutes to 0.15 percent vapor.

SUMMARY OF FATALITY AND PHYSIOLOGICAL RESPONSE

The fatality and summary of response of guinea pigs exposed to pentanone vapor in air are shown graphically in figure 1 and given in conventional degrees of response in table 4. The results of each experiment are designated by a symbol which represents one of four different degrees of severity. The symbols represent the most severe response for a majority or at least three of a group of six animals exposed to a given condition. The response of none of the animals deviated markedly from that which is representative of the group.

The four degrees of response are given in the legend on figure 1. In addition to representing the response of each group by symbols, the symbols have been separated into three general zones of probable response.

Table 4 gives concentrations (obtained by direct experiment or extrapolated from table 3 and fig. 1) which produce the degrees of response generally reported for noxious gases, These data may be compared with toxicological data for other compounds. [9] [10] [11] [12] [13] [14]

TABLE 4.—*Acute effects of exposure of guinea pigs to pentanone vapor in air*

Acute effects after various periods of exposure	Concentration, percent by volume in air
Kills in a few minutes	(1)
Dangerous to life in 30 to 60 minutes	3.0–5.0
Dangerous to life after several hours	0.8–1.0
Maximum amount for 1 hour without serious disturbance	[2] 0.5
Maximum amount for several hours without serious disturbance	0.2–0.4
Maximum amount for several hours with but slight or no symptoms	[3] 0.15

[1] Not produced by 5 percent, the highest concentration obtained in a closed chamber by extended recirculation of air (30° C., 740 mm pressure) over wicks wet with pentanone.
[2] This concentration was found to be very irritating to men even for short exposures.
[3] This concentration was found by men to have a strong odor and moderate to marked irritation of the eyes and nasal passages, although no definite reaction was noted in guinea pigs even after 810 minutes exposure.

[9] See footnote 5.

[10] Sayers, R. R., Yant, W. P., Thomas, B. G. H., and Berger, L. B.: Physiological response attending exposure to methyl bromide, methyl chloride, ethyl bromide, and ethyl chloride. Pub. Health Bull. 185 (1929).

[11] International Critical Tables, first edition (1927), vol. 2, p. 318; also see errata sheet, vol. 2.

[12] Henderson, Y., and Haggard, H. W.: Noxious gases. American Chemical Society Monograph No. 35 Chemical Catalog Co., New York. (1927).

[13] Flury, F., and Zernik, F.: Schädliche Gase. Berlin. Published by Julius Springer. (1931.)

[14] Fieldner, A. C., Katz, S. H., and Kinney, S. P.: Gas masks for gases met in fighting fires. U. S. Bureau of Mines Technical Paper 248. (1921.)

CAUSE OF DEATH

Death apparently was due to a state of narcosis which terminated in death rather than to the irritation of the lungs. It is noteworthy that no animals died after exposure. They either died during exposure or survived the exposure and the 4- or 8-day post-exposure observation period. In some instances the animals were unconscious for several hours after removal from exposure (30 minutes to 5 percent, 105 minutes to 1.3 percent, and 810 minutes to 0.5 percent) but appeared normal in all instances 24 hours after exposure.

COMPARISON OF ACUTE TOXICITY OF BUTANONE AND PENTANONE

The acute toxicity of pentanone, as indicated by exposure of guinea pigs, is about twice that of butanone; [15] owing to its lower volatility, however, the maximum concentration obtained with pentanone was only about half that obtained with butanone. From a practical viewpoint, the lower volatility would under similar conditions of usage tend to compensate for the higher toxicity.

WARNING PROPERTIES AND HAZARDS OF ACUTE POISONING

Men momentarily exposed to 1.3 and approximately 5.0 percent pentanone vapor pronounced the atmosphere extremely disagreeable because of irritation to the eyes and nasal passages. One-half percent was found to be very disagreeable, and 0.15 percent vapor was found to have a strong odor and to produce a moderate to marked sense of irritation to the eyes and nasal passages.

Concentrations without apparent harm to guinea pigs after one exposure of several hours have warning properties of both odor and irritation that are very disagreeable to human beings.

WARNING PROPERTIES AND EXPLOSION HAZARDS

The explosive hazard of pentanone is minimized by the distinct warning properties of concentrations below the inflammable range, but cannot be ignored. A few determinations of the inflammable properties of the vapor of the pentanone used in this study indicated the limits to be, approximately, 1.5 (lower) and 8 percent (upper) by volume.

SUMMARY AND CONCLUSIONS

The acute physiological response of guinea pigs to air containing pentanone (methyl propyl ketone) vapor was determined. The concentrations of vapor ranged from those that produced death to those that produced no effect after several hours' exposure. The signs of response, fatality, and gross pathology are given. The warning properties as studied by the exposure of persons are described.

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[15] See footnote 5.

1. Pentanone produces narcosis, terminating in death in the higher concentrations. Symptoms are principally eye and nasal irritation, followed by narcosis. Animals that did not die during exposure, recovered.

2. The principal gross pathological findings were congestion, edema, and hemorrhage of lungs, liver, and kidneys, as observed in the autopsies performed immediately after exposure.

3. At room temperature it was not possible to attain a concentration that would kill guinea pigs in a few minutes. Exposure to 3.0 to 5.0 percent vapor is considered dangerous to the life of guinea pigs after 30 to 60 minutes. One-half of 1 percent is considered the maximum amount for 60 minutes without serious disturbance. The maximum for several hours with but slight or no symptoms was 0.15 percent.

4. Pentanone has a distinct odor and is markedly irritating to the nose and eyes of human beings in concentrations found to be harmful to guinea pigs. It also has a strong odor and moderate to marked irritation to human beings in concentrations producing but slight to no sign of response in guinea pigs after several hours. The approximate inflammable limits are 1.5 (lower) and 8 percent (upper) by volume in air. The inflammable range of mixtures is extremely disagreeable to human beings because of odor, and eye and nasal irritation.

ACKNOWLEDGMENTS

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DEATHS DURING WEEK ENDED MAR. 14, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar. 14, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	10,082	8,738
Deaths per 1,000 population, annual basis	14.1	12.2
Deaths under 1 year of age	605	613
Deaths under 1 year of age per 1,000 estimated live births	55	56
Deaths per 1,000 population, annual basis, first 11 weeks of year	13.7	12.9
Data from industrial insurance companies:		
Policies in force	68,130,517	67,549,346
Number of death claims	15,158	14,022
Death claims per 1,000 policies in force, annual rate	11.6	10.8
Death claims per 1,000 policies, first 11 weeks of year, annual rate	10.9	10.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Mar. 21, 1936, and Mar. 23, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 21, 1936, and Mar. 23, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935
New England States:								
Maine	2		16	4	75	319	0	0
New Hampshire					2	8	0	1
Vermont	1	1			794	3	0	0
Massachusetts	5	6			858	447	12	4
Rhode Island					81	92	2	4
Connecticut	3	8	48	4	85	1,213	1	0
Middle Atlantic States:								
New York	38	88	[1] 40	[1] 17	2,739	2,433	31	15
New Jersey	10	19	64	11	193	1,300	5	2
Pennsylvania	26	53			952	5,717	6	6
East North Central States:								
Ohio	21	33	13	18	264	1,073	13	12
Indiana	11	19	49	42	8	440	5	0
Illinois	33	71	47	49	50	3,231	18	13
Michigan	7	13	7	6	88	3,825	4	0
Wisconsin	2	8	75	31	104	1,583	3	3
West North Central States:								
Minnesota	2	1			349	1,701	2	0
Iowa	18	12	12	15	4	1,496	5	1
Missouri	83	24	1,040	115	26	698	4	13
North Dakota	1	5	5		5	109	0	0
South Dakota		6		2	2	53	1	2
Nebraska	9	3		13	85	597	1	5
Kansas	13	14	121	10		1,694	1	1
South Atlantic States:								
Delaware		1	2	2	8	7	2	0
Maryland [2]	7	8	27	23	176	82	21	5
District of Columbia	13	19	4	4	37	77	4	12
Virginia	14	18	1,331		257	1,262	11	3
West Virginia	13	8	173	79	30	620	5	0
North Carolina	9	12	351	49	71	613	7	5
South Carolina	2	7	689	347	36	36	7	0
Georgia [3]	11	6	788	73			7	1
Florida	5	10	47	11	4	68	6	1
East South Central States:								
Kentucky	8	11	190	109	122	1,615	48	7
Tennessee	8	9	569	135	106	75	20	8
Alabama [3]	2	9	2,216	371	23	519	5	4
Mississippi [2]	4	8					0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 21, 1936, and Mar. 23, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935
West South Central States:								
Arkansas	8	7	607	110	4	192	6	3
Louisiana	15	28	385	70	84	208	2	0
Oklahoma [4]	7	10	305	163	15	108	5	5
Texas [3]	38	48	558	949	392	131	10	0
Mountain States:								
Montana		4	7		13	309	0	3
Idaho	1		9	6	10	82	2	0
Wyoming	1				6	169	0	0
Colorado	4	3			13	352	0	0
New Mexico	6	1		18	29	18	2	5
Arizona	2	2	298	36	37	29	0	2
Utah [3]	2				17	14	0	0
Pacific States:								
Washington	2	1	35	5	278	203	3	1
Oregon	4	1	134	85	399	175	2	4
California	30	37	1,187	83	1,985	984	8	8
Total	507	597	11,449	2,955	10,885	35,373	297	159
First 12 weeks of year	7,509	8,792	87,599	89,257	91,852	278,285	2,640	1,479

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935
New England States:								
Maine	0	0	6	17	0	0	0	4
New Hampshire	0	0	2	18	0	0	0	0
Vermont	0	0	20	26	0	0	0	1
Massachusetts	0	0	280	255	0	0	1	2
Rhode Island	0	0	29	6	0	0	1	0
Connecticut	0	0	116	121	0	0	1	0
Middle Atlantic States:								
New York	1	0	1,153	1,160	0	0	8	9
New Jersey	0	1	640	166	0	0	0	3
Pennsylvania	1	0	522	756	0	0	7	7
East North Central States:								
Ohio	0	2	367	968	1	0	45	2
Indiana	0	0	337	171	5	0	1	0
Illinois	2	0	1,067	1,316	19	1	1	6
Michigan	0	0	326	487	2	0	0	4
Wisconsin	2	0	669	459	11	38	1	1
West North Central States:								
Minnesota	0	0	387	258	0	14	0	1
Iowa	1	0	283	102	27	2	4	5
Missouri	0	0	247	79	10	5	3	0
North Dakota	1	0	47	119	4	0	0	0
South Dakota	0	0	58	7	14	3	0	0
Nebraska	2	0	209	42	51	31	0	0
Kansas	0	0	378	52	74	29	0	0
South Atlantic States:								
Delaware	0	0	4	23	0	0	0	0
Maryland [3]	1	1	92	108	0	0	2	4
District of Columbia	0	0	19	144	0	0	1	0
Virginia	0	0	59	54	0	1	1	1
West Virginia	0	0	52	93	0	0	7	7
North Carolina	0	2	27	40	1	0	1	3
South Carolina	0	0	1	5	2	0	2	0
Georgia [3]	0	1	27	6	0	0	2	1
Florida	0	0	6	1	0	0	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 21, 1936, and Mar. 23, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 21, 1936	Week ended Mar 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935	Week ended Mar. 21, 1936	Week ended Mar. 23, 1935
East South Central States:								
Kentucky	2	0	42	68	0	0	3	2
Tennessee	0	0	47	20	8	0	3	1
Alabama [3]	0	0	11	12	1	0	1	0
Mississippi [2]	0	0	10	11	0	0	0	2
West South Central States:								
Arkansas	0	0	17	8	1	0	0	1
Louisiana	0	1	15	15	0	1	5	9
Oklahoma [4]	0	0	34	80	2	0	1	1
Texas [3]	0	1	57	74	1	24	2	9
Mountain States:								
Montana	0	0	103	12	14	20	0	1
Idaho	0	0	31	4	2	0	0	2
Wyoming	0	0	45	22	0	19	0	0
Colorado	0	0	108	287	1	0	0	1
New Mexico	0	0	88	14	1	2	2	2
Arizona	0	1	27	22	0	0	0	0
Utah [2]	0	0	96	141	1	0	0	0
Pacific States:								
Washington	0	0	101	50	11	20	2	0
Oregon	0	0	43	50	2	2	2	1
California	5	5	347	240	14	4	2	3
Total	18	15	8,652	8,159	272	216	111	97
First 12 weeks of year	248	309	92,710	83,940	2,785	2,329	1,247	1,535

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Mar. 21, 1936, 10 cases, as follows: Georgia, 2; Alabama, 3; Texas, 5.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January 1936										
Massachusetts	17	55			1,629	1	1	1,308	0	7
February 1936										
Alabama	6	83	5,018	95	134	14	6	112	8	9
Arizona	4	13	1,042		141	3	1	155	1	2
Georgia	18	41	4,575	57	16	17	0	110		5
Idaho	8	3	34		187		1	632	18	2
Illinois	54	163	193	10	113	1	1	3,156	39	11
Maine	3	11	15		1,749		1	113	0	2
Maryland	41	32	149		637		1	358	0	5
Massachusetts	24	32			2,477	2	2	1,695	0	9
Minnesota	10	14	4		824		0	1,447	40	4
Montana	7	7	171		126		0	519	32	3
Nevada	1	1	139		30		0	29	1	0
New Jersey	15	52	120		416		3	1,417	0	6
New York	73	137		1	7,685		1	4,032	0	22
Oregon	5	10	532		3,206		4	185	7	6
Rhode Island	3	3	9		287		0	122	0	1
South Dakota	4	9	16		22		0	244	74	6
West Virginia	27	52	572		80			169	1	5

January 1936

	Cases
Massachusetts:	
Anthrax	1
Chicken pox	1,803
Dysentery (bacillary)	5
German measles	245
Lead poisoning	1
Mumps	2,101
Ophthalmia neonatorum	85
Paratyphoid fever	1
Rabies in animals	6
Septic sore throat	17
Tetanus	1
Trachoma	2
Trichinosis	2
Typhus fever	1
Undulant fever	5
Whooping cough	857

February 1936

	Cases
Anthrax:	
Massachusetts	2
New Jersey	1
New York	2
Chicken pox:	
Alabama	229
Arizona	205
Georgia	164
Idaho	60
Illinois	1,881
Maine	308
Maryland	279
Massachusetts	1,220
Minnesota	528
Montana	88
Nevada	39
New Jersey	1,360
New York	2,509
Oregon	184
Rhode Island	99
South Dakota	148
West Virginia	329
Conjunctivitis:	
Georgia	2
Dengue:	
Georgia	5
Dysentery:	
Arizona (bacillary)	8
Georgia (amebic)	9
Illinois (amebic)	12
Illinois (amebic carriers)	17
Illinois (bacillary)	41
Maine (bacillary)	5
Maryland (bacillary)	2
Minnesota (amebic)	1
Montana (bacillary)	1
New Jersey (amebic)	1
New York (amebic)	2
New York (bacillary)	21
Epidemic encephalitis:	
Alabama	1
Arizona	1
Illinois	6
Maine	1
Maryland	1
Massachusetts	1
Minnesota	1
New Jersey	5
New York	6

February 1936—Continued

	Cases
Epidemic encephalitis—Continued.	
Rhode Island	1
West Virginia	1
German measles:	
Arizona	51
Illinois	35
Maine	136
Maryland	76
Massachusetts	424
Montana	6
New Jersey	261
New York	681
Rhode Island	32
Hookworm disease:	
Georgia	1,476
Impetigo contagiosa:	
Arizona	2
Maryland	13
Oregon	62
Lead poisoning:	
Illinois	3
Leprosy:	
Georgia	1
Mumps:	
Alabama	510
Arizona	432
Georgia	250
Idaho	202
Illinois	1,316
Maine	1,204
Maryland	382
Massachusetts	2,213
Montana	682
Nevada	11
New Jersey	1,122
Oregon	170
Rhode Island	227
South Dakota	127
West Virginia	194
Ophthalmia neonatorum:	
Alabama	1
Illinois	5
Maryland	1
Massachusetts	67
New Jersey	3
New York	7
Paratyphoid fever:	
Minnesota	1
New Jersey	1
New York	1
Puerperal septicemia:	
Illinois	2
Rabies in animals:	
Illinois	12
Maryland	1
Massachusetts	13
New Jersey	22
New York [1]	10
Oregon	5
Scabies:	
Oregon	60
Septic sore throat:	
Georgia	51
Idaho	5
Illinois	6
Maine	4
Maryland	20
Massachusetts	17
Minnesota	6
Montana	10
New York	111

February 1936—Continued

	Cases
Septic sore throat—Con.	
Oregon	17
Rhode Island	2
Tetanus:	
Alabama	5
Georgia	1
Illinois	2
Maryland	2
New Jersey	2
New York	1
Trachoma:	
Arizona	40
Idaho	15
Illinois	71
Massachusetts	2
New Jersey	1
Trichinosis:	
Georgia	1
Illinois	4
Massachusetts	2
New Jersey	1
New York	25
Tularaemia:	
Alabama	3
Georgia	3
Illinois	6
Maryland	1
New Jersey	1
Typhus fever:	
Alabama	10
Georgia	10
Massachusetts	3
New York	1
Undulant fever:	
Alabama	5
Arizona	1
Georgia	1
Illinois	2
Maine	2
Maryland	2
Massachusetts	4
Minnesota	6
New Jersey	2
New York	11
Oregon	1
Vincent's infection:	
Illinois	23
Maine	9
Maryland	10
New York [1]	95
Oregon	9
Whooping cough:	
Alabama	71
Arizona	82
Georgia	58
Idaho	16
Illinois	1,110
Maine	137
Maryland	143
Massachusetts	310
Minnesota	89
Montana	39
Nevada	1
New Jersey	414
New York	948
Oregon	47
Rhode Island	16
South Dakota	11
West Virginia	60

[1] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Mar. 14, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	2	0	4	9	2	0	1	0	3	35
New Hampshire:											
Concord	0	------	0	0	0	0	0	1	0	0	10
Nashua	0	------	------	0	2	1	0	------	0	0	------
Vermont:											
Burlington	0	------	0	11	0	0	0	0	0	1	3
Rutland	0	------	0	50	0	0	0	0	0	0	8
Massachusetts:											
Boston	1	------	1	351	26	82	0	18	1	23	237
Fall River	0	------	2	1	3	8	0	2	0	2	38
Springfield	0	------	0	3	5	2	0	1	0	4	30
Worcester	0	------	0	1	11	24	0	2	0	10	63
Rhode Island:											
Pawtucket	0	------	0	0	0	2	0	0	0	0	20
Providence	0	------	1	19	13	14	0	1	0	5	67
Connecticut:											
Bridgeport	1	1	1	1	6	4	0	0	0	4	40
Hartford	0	1	0	0	8	6	0	0	0	6	47
New Haven	0	9	1	0	9	1	0	0	0	48	72
New York:											
Buffalo	0	2	1	29	17	86	0	6	0	15	148
New York	28	66	20	1,581	250	596	0	90	6	81	1,820
Rochester	0	------	0	0	17	6	0	3	0	0	112
Syracuse	0	------	1	32	2	7	0	0	0	3	42
New Jersey:											
Camden	2	------	0	0	1	10	0	1	0	0	33
Newark	0	52	0	6	19	241	0	9	0	10	122
Trenton	0	------	0	1	5	5	0	1	0	16	33
Pennsylvania:											
Philadelphia	5	27	13	456	75	89	0	23	1	48	650
Pittsburgh	2	14	6	42	37	105	0	6	0	11	222
Reading	0	------	0	3	4	2	0	1	0	0	27
Scranton	1	------	------	105	------	7	0	------	0	0	------
Ohio:											
Cincinnati	3	------	3	5	20	22	0	9	0	4	152
Cleveland	2	59	4	73	26	61	0	14	0	73	227
Columbus	0	1	1	1	7	17	0	4	0	8	86
Toledo	0	1	1	39	7	9	0	6	0	9	81
Indiana:											
Anderson	0	------	0	0	3	3	0	0	0	12	12
Fort Wayne	1	------	0	0	0	16	0	0	0	0	30
Indianapolis	3	------	1	1	18	58	0	5	1	27	118
Muncie	0	------	0	0	1	2	0	1	0	0	3
South Bend	0	------	1	1	2	1	0	1	0	9	18
Terre Haute	0	------	0	0	0	9	0	0	0	0	21
Illinois:											
Alton	0	------	0	0	2	2	0	0	0	0	14
Chicago	7	9	5	11	68	275	0	50	1	223	789
Elgin	0	------	0	0	2	3	0	0	0	1	11
Moline	0	2	0	0	0	9	0	1	0	1	8
Springfield	0	------	0	0	6	17	0	0	0	1	31
Michigan:											
Detroit	3	7	7	26	42	161	2	15	1	190	300
Flint	0	------	0	0	1	8	0	0	0	30	23
Grand Rapids	0	------	0	11	0	8	0	0	0	7	32
Wisconsin:											
Kenosha	0	------	0	1	0	5	0	0	0	1	12
Madison	0	------	0	0	1	10	0	1	0	7	12
Milwaukee	1	------	0	8	9	122	0	5	0	96	144
Racine	2	------	0	5	0	17	0	1	0	8	16
Superior	0	------	0	0	2	14	0	0	0	0	6
Minnesota:											
Duluth	0	------	0	1	2	3	0	0	0	11	15
Minneapolis	2	------	2	165	12	154	0	0	1	12	109
St. Paul	0	------	0	161	14	61	0	2	0	9	70
Iowa:											
Cedar Rapids	0	------	------	0	------	4	0	------	0	1	------
Des Moines	1	------	------	0	------	10	0	------	0	0	36
Sioux City	0	------	------	0	------	8	9	------	0	0	------
Waterloo	0	------	------	2	------	4	------	------	1	3	------

City reports for week ended Mar. 14, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	3	11	11	1	36	62	0	3	0	0	147
St. Joseph	0	------	3	0	7	2	1	2	0	0	23
St. Louis	8	7	4	2	10	54	0	11	0	4	251
North Dakota:											
Fargo	0	------	0	0	1	4	1	0	0	2	10
Grand Forks	0	------	------	0	------	0	4	------	0	0	------
Minot	0	------	------	0	------	4	0	------	0	0	2
South Dakota:											
Aberdeen	0	------	------	0	------	5	0	------	0	0	------
Sioux Falls	0	------	------	3	------	10	0	------	0	0	8
Nebraska:											
Omaha	4	------	2	2	15	120	12	2	0	1	72
Kansas:											
Lawrence	0	86	0	0	0	0	0	0	0	0	6
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	1	1	0	5	15	1	0	1	2	34
Delaware:											
Wilmington	0	------	0	0	8	1	0	1	0	8	29
Maryland:											
Baltimore	0	40	9	43	44	37	0	15	1	31	280
Cumberland	0	1	0	0	1	4	0	0	0	0	10
Frederick	0	------	0	0	1	0	0	0	0	0	5
District of Columbia:											
Washington	25	3	2	63	32	24	0	11	0	8	196
Virginia:											
Lynchburg	0	------	1	3	2	1	0	0	0	7	15
Norfolk	------	31	0	0	4	1	0	1	0	0	34
Richmond	1	------	1	2	12	34	0	1	0	2	60
Roanoke	0	------	0	0	1	2	0	0	1	0	24
West Virginia:											
Charleston	0	11	1	0	4	3	0	0	0	1	20
Huntington	0	------	------	0	------	0	0	------	0	0	------
Wheeling	0	------	0	4	5	4	0	1	0	3	21
North Carolina:											
Gastonia	1	3	0	0	4	0	0	0	0	0	8
Raleigh	0	------	0	1	6	0	0	2	0	4	21
Wilmington	0	------	0	0	4	1	0	0	0	0	16
Winston-Salem	0	1	0	156	1	1	0	1	0	0	16
South Carolina:											
Charleston	0	51	1	0	4	1	0	5	0	1	20
Columbia	0	------	0	0	0	0	0	0	0	0	6
Florence	0	------	0	0	3	0	0	0	0	0	10
Greenville	1	------	0	18	2	1	0	5	0	0	17
Georgia:											
Atlanta	3	41	8	2	13	13	0	4	1	0	85
Brunswick	0	2	2	0	2	0	0	0	0	0	6
Savannah	1	45	7	0	5	2	0	1	1	0	35
Florida:											
Miami	0	------	0	1	3	0	0	1	0	3	36
Tampa	1	4	3	1	2	3	0	2	0	1	28
Kentucky:											
Ashland	0	9	------	0	------	0	0	------	0	2	------
Covington	3	2	0	2	1	3	0	0	0	0	20
Lexington	0	------	0	0	5	0	0	3	0	2	25
Louisville	0	2	2	3	9	8	0	0	0	11	86
Tennessee:											
Knoxville	1	------	1	47	3	1	0	3	2	0	28
Memphis	0	------	2	2	16	19	0	9	0	1	109
Nashville	2	------	2	0	6	0	0	3	0	4	59
Alabama:											
Birmingham	1	172	9	2	27	4	0	2	0	4	109
Mobile	1	8	6	0	7	2	0	0	0	0	26
Montgomery	0	3	------	0	------	0	0	------	0	1	------
Arkansas:											
Fort Smith	0	------	------	0	------	0	0	------	0	0	------
Little Rock	1	------	2	0	16	0	0	7	0	0	28
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	1
New Orleans	9	13	7	26	23	6	0	18	3	30	197
Shreveport	0	------	0	33	12	0	0	5	0	0	46
Oklahoma:											
Oklahoma City	1	------	1	0	11	8	0	1	0	3	------
Texas:											
Dallas	5	4	3	106	14	8	0	6	0	4	81
Fort Worth	2	------	0	2	15	1	1	2	0	0	51
Galveston	2	------	0	0	7	0	0	1	0	0	19
Houston	6	------	5	18	14	3	0	2	1	0	78
San Antonio	1	------	2	2	1	2	0	2	0	0	84

City reports for week ended Mar. 14, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	0	------	0	0	2	8	0	0	0	0	11
Great Falls	1	------	0	0	2	9	0	0	0	4	11
Helena	3	------	0	0	0	0	0	0	0	0	11
Missoula	0	------	0	1	3	4	0	0	0	0	10
Idaho:											
Boise	0	------	0	11	0	8	0	0	0	0	12
Colorado:											
Colorado Spgs	0	------	0	1	2	9	0	2	0	7	9
Denver	0	------	5	8	15	24	0	5	0	11	97
Pueblo	0	------	0	0	2	23	0	1	0	3	9
New Mexico:											
Albuquerque	0	------	1	0	3	18	0	3	0	2	13
Utah:											
Salt Lake City	0	------	0	1	2	72	1	0	0	4	31
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	4	112	19	21	7	6	0	4	124
Spokane	0	2	2	3	12	12	0	0	0	4	54
Tacoma	0	------	1	60	5	3	0	1	0	0	38
Oregon:											
Portland	0	6	2	147	7	7	0	6	0	14	80
Salem	0	5	------	4	------	1	1	------	0	0	------
California:											
Los Angeles	13	121	7	557	35	88	0	30	1	18	437
Sacramento	2	8	2	14	2	2	0	5	0	8	29
San Francisco	1	5	0	548	5	89	0	6	0	25	156

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	6	1	0
Worcester	0	1	0
Rhode Island:			
Providence	1	1	0
New York:			
Buffalo	1	1	0
New York	23	13	2
Pennsylvania:			
Philadelphia	2	2	0
Pittsburgh	0	0	1
Ohio:			
Cincinnati	5	2	0
Cleveland	0	1	0
Columbus	0	1	0
Indiana:			
Indianapolis	1	1	0
Illinois:			
Chicago	6	4	1
Springfield	1	0	0
Michigan:			
Detroit	3	2	0
Flint	0	1	0
Grand Rapids	0	1	0
Minnesota:			
Minneapolis	2	1	0
Iowa:			
Des Moines	1	0	0
Missouri:			
Kansas City	2	2	0
St. Joseph	1	0	0
St. Louis	4	0	0
Nebraska:			
Omaha	1	0	0
Maryland:			
Baltimore	10	4	0
District of Columbia:			
Washington	2	0	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Virginia:			
Norfolk	3	1	0
Richmond	1	1	0
Roanoke	1	2	0
South Carolina:			
Charleston	6	2	0
Georgia:			
Atlanta	4	4	0
Kentucky:			
Louisville	2	1	0
Tennessee:			
Knoxville	1	0	0
Memphis	0	1	0
Alabama:			
Birmingham	1	0	0
Arkansas:			
Fort Smith	1	0	0
Little Rock	0	1	0
Louisiana:			
Shreveport	0	1	0
Oklahoma:			
Oklahoma City	4	2	0
Texas:			
Galveston	2	1	0
Houston	8	1	0
Colorado:			
Denver	2	0	0
Utah:			
Salt Lake City	1	1	0
Washington:			
Seattle	1	0	1
Oregon:			
Portland	1	1	0
California:			
Los Angeles	3	5	2
Sacramento	1	0	0

Epidemic encephalitis.—Cases: Philadelphia, 2; Toledo, 1; Chicago, 1; Louisville, 1; Birmingham, 1; San Francisco, 1.

Pellagra.—Cases: Boston, 1; Baltimore, 1; Charleston, S. C., 2; Savannah, 3; Memphis, 1; Birmingham, 2; Dallas, 1; Los Angeles, 3; San Francisco, 1.

Typhus fever.—Cases: Atlanta, 1.

FOREIGN AND INSULAR

ARGENTINA

Buenos Aires—Poliomyelitis.—According to a report dated March 23, 1936, an epidemic of poliomyelitis had occurred in the city of Buenos Aires, Argentina, where 500 cases had been reported.

CANADA

Provinces—Communicable diseases—2 weeks ended March 7, 1936.—During the 2 weeks ended March 7, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1	5	4		1	1		12
Chicken pox		14	4	304	543	39	33	25	108	1,070
Diphtheria		12	4	48	8	10	13		2	97
Erysipelas				15	7	4	3	2	4	35
Influenza		15			314	13	41		781	1,164
Lethargic encephalitis				1						1
Measles	11	88	11	3,500	5,679	1,177	87	108	732	11,393
Mumps		5			918	135	1,387	76	261	2,777
Paratyphoid fever					1					1
Pneumonia					64		3		7	74
Poliomyelitis			1	1			1			3
Scarlet fever		33	2	291	674	99	43	122	50	1,314
Smallpox								7	1	8
Trachoma									1	1
Tuberculosis	4	2	15	111	89	26	15	4	23	289
Typhoid fever	1		5	29	10	9	4		2	60
Undulant fever				2	3					5
Whooping cough		23	117	165	352	21	58	9	72	817

Vital statistics—Third quarter 1935.—The Bureau of Statistics of the Dominion of Canada has published the following preliminary statistics for the third quarter of 1935. The rates are computed on an annual basis. There were 20.3 live births per 1,000 population during the third quarter of 1935 and 20.9 per 1,000 population in the same quarter of 1934. The death rate was 8.5 per 1,000 population for the third quarter of 1935 and 8.6 per 1,000 population for the third quarter of 1934. The infant mortality rate for the third quarter of 1935 was 63 per 1,000 live births and 69 in the corresponding quarter of 1934. The maternal death rate was 4.1 per 1,000 live births for the third quarter of 1935, and 4.5 for the same quarter of 1934.

The accompanying tables give the number of births, deaths, and marriages by Provinces for the third quarter of 1935, and deaths

from certain causes in Canada for the third quarter of 1935, and the corresponding quarter of 1934, and by Provinces for the third quarter of 1935.

Number of births, deaths, and marriages, third quarter 1935

Province	Live births	Deaths (exclusive of stillbirths)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	55,998	23,557	3,520	230	22,655
Prince Edward Island	516	219	35	2	170
Nova Scotia	2,952	1,284	180	11	1,179
New Brunswick	2,556	1,070	237	7	1,093
Quebec	19,226	7,442	1,645	79	6,772
Ontario	16,126	8,133	785	81	7,934
Manitoba	3,442	1,333	167	9	1,389
Saskatchewan	4,931	1,350	237	17	1,190
Alberta	3,699	1,166	147	14	1,460
British Columbia	2,550	1,560	87	10	1,468

[1] Exclusive of Yukon and Northwest Territories.

Number of deaths, Canada, third quarter 1934 and 1935, and by Provinces, third quarter 1935

Cause of death	Canada[1] (third quarter)		Province, third quarter 1935								
	1934	1935	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents	429	406	1	22	17	119	158	21	19	11	38
Cancer	2,607	2,821	20	154	114	719	1,098	194	153	150	219
Diarrhea and enteritis	1,617	1,230	9	41	109	768	189	41	37	21	15
Diphtheria	49	46		1	4	23	10	4	3	1	
Diseases of the arteries	1,616	1,858	10	110	59	342	939	113	87	94	104
Diseases of the heart	3,539	3,341	24	159	110	786	1,436	182	194	181	269
Homicides	41	42		2		9	15	3	6	4	3
Influenza	185	218	2	13	9	75	69	10	15	13	12
Measles	24	41			3	16	11	4	2	3	2
Nephritis	1,252	1,425	11	80	38	623	426	51	56	51	89
Pneumonia	836	886	14	38	64	233	318	69	56	40	54
Poliomyelitis	.40	23	2	1		2	5	4		8	1
Puerperal causes	258	230	2	11	7	79	81	9	17	14	10
Scarlet fever	36	31	1	1		18	9	1		1	
Smallpox											
Suicides	248	218	2	6	8	31	96	14	21	21	19
Tuberculosis	1,426	1,525	.19	116	66	678	319	105	58	45	119
Typhoid fever and paratyphoid fever	90	92		2	5	48	21	3	6	3	4
Other violent deaths	1,284	1,454	16	66	65	382	522	95	91	89	128

[1] Exclusive of Yukon and the Northwest Territories.

CUBA

Habana—Communicable diseases—4 weeks ended March 14, 1936.—During the 4 weeks ended March 14, 1936, certain communicable diseases were reported in Habana, Cuba as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	15		Tuberculosis	43	1
Malaria	[1] 26	1	Typhoid fever	[1] 29	1

[1] Includes imported

Provinces—Notifiable diseases—4 weeks ended March 7, 1936.—During the 4 weeks ended March 7, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	2	1	1			5
Chicken pox		26	3	12	2	31	74
Diphtheria	1		1	1	3		6
Hookworm disease			1				1
Leprosy		5					5
Malaria	110	39	16	144	251	1,063	1,623
Measles	2	1		1	2		6
Poliomyelitis	1	1		1		3	6
Tuberculosis	12	23	15	33	15	24	122
Typhoid fever	4	25	10	22	6	37	104

EGYPT

Infectious diseases—Second quarter 1935.—During the second quarter of 1935, certain infectious diseases were reported in Egypt as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	8		Plague	26	14
Cerebrospinal fever	54	56	Poliomyelitis	2	
Chicken pox	735	8	Puerperal septicemia	122	104
Diphtheria	367	176	Rabies		8
Dysentery	629	125	Scarlet fever	14	1
Epidemic jaundice	1		Smallpox	40	8
Erysipelas	1,162	255	Tetanus	97	65
Influenza	2,159	165	Tuberculosis (pulmonary)	1,194	577
Leprosy	45	30	Typhoid fever	1,115	346
Lethargic encephalitis	2	2	Typhus fever	1,446	343
Malaria	712	10	Undulant fever	6	
Measles	2,870	862	Whooping cough	736	47
Mumps	346	11			

Vital statistics—Second quarter 1935.—Following are vital statistics for the second quarter of 1935 in all places in Egypt having a health bureau:

Population	4,603,100	Deaths per 1,000 population	32.8
Live births	45,924	Deaths from diarrhea and enteritis under 2 years	12,146
Births per 1,000 population	39.9	Infant mortality per 1,000 live births	298
Stillbirths	827		
Total deaths	37,737		

GERMANY

Vital statistics—Third quarter 1935.—Following are vital statistics for Germany for the third quarter of 1935:

Number of marriages	151,082	Total deaths	170,739
Number of marriages per 1,000 population	9.0	Deaths per 1,000 population	10.2
Number of live births	307,566	Deaths under 1 year of age	18,206
Number of live births per 1,000 population	18.4	Deaths under 1 year of age per 100 live births	5.9
Number of stillbirths	7,396		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for March 27, 1936, pages 349-361. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued April 24, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

Siam.—According to information dated March 4, 1936, there had been a total of 3,540 cases of cholera with 2,280 deaths in the Kingdom of Siam. The total number of cases of cholera in Bangkok was 734 with 355 deaths. During the first 2 weeks of February 1936, there occurred 632 cases of cholera with 411 deaths in Siam, and 188 cases of cholera with 105 deaths in Bangkok. During January and February the number of admitted cases of cholera in Siam was 2,116 with 1,354 deaths, considerably more than for all the preceding 8 months of the epidemic.

Plague

Basutoland.—During the week ended February 29, 1936, 2 cases of plague, including 1 suspected case, were reported in Basutoland.

Smallpox

China—Hong Kong.—During the week ended March 7, 1936, 2 cases of smallpox with 1 death were reported at Hong Kong, China.

Colombia—Santa Marta.—During the month of February 1936, 1 death from smallpox was reported at the port of Santa Marta, Colombia.

Dutch East Indies—Palembang.—For the week ended March 7, 1936, 1 case of smallpox was reported at Palembang, Dutch East Indies.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Minas Geraes State, for the period February 7–12, 1936, Altinopolis, 2 cases, 2 deaths; February 23, 1936, Santa Rita Cassia, 1 case, 1 death. Parana State: for the period February 16–25, 1936, Arthur Bernardes, 2 cases, 2 deaths; Barra Bonita, 1 case, 1 death; Guaraiava, 1 case, 1 death; Thomazina, 1 case, 1 death. February 28–March 1, 1936: Londrina, 2 cases, 2 deaths. Sao Paulo State, February 29, 1936, Batataes, 1 case, 1 death; February 26–29, 1936, Araraquara, 2 cases, 2 deaths; February 26–March 3, 1936, Rincao, 2 cases, 2 deaths; March 4, 1936, Cerqueira Cezar, 1 case, 1 death.

Colombia.—According to a report dated February 17, 1936, yellow fever has been reported in Colombia as follows: Department of Boyaca, 3 cases, and Intendencia of Meta, 3 cases.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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BY THE UNITED STATES PUBLIC HEALTH SERVICE

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878, under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

February 23–March 21, 1936

Influenza.—During the 4 weeks ended March 21 approximately 44,000 cases of influenza were reported, as compared with 19,456, 11,259, and 11,332 for the corresponding period in the years 1935, 1934, and 1933, respectively. Influenza has remained at a fairly low level during the winter, and the sharp rise during the last two periods was confined mostly to certain geographic areas. In the South Atlantic region, South Carolina reported 4,076 cases for the 4 weeks ended March 21, and Georgia reported 5,209; Virginia, which is not included in this summary because of lack of comparative data, reported 5,607 cases for the 3 weeks ended March 21; Missouri, in the West North Central region, reported 3,145 cases for the 4-week period. The incidence in each of those regions was almost three times that for the corresponding period last year. In the South Central region, Alabama reported 8,963 cases and Texas 3,372 cases; in this section the incidence was 1.7 times that for last year. Arizona (Mountain region) reported 1,131 cases and California (Pacific region) 5,969 cases. The total for the two combined areas was almost four times last year's figure for this period.

Table 1 shows, by geographic areas, the number of cases reported for each week of 1936, with comparative data for the 2 preceding years. During the 4 weeks ended March 21 the weekly incidence for the entire reporting area, as well as for each geographic area, except the East North Central, was the highest in the 3 years included in the table. During the first weeks of the year the incidence was well below that of last year in all sections and in some sections it was lower than in 1934, a low year for influenza.

[1] From the Office of Statistical Investigations, U S Public Health Service These summaries include only the 8 important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers The numbers of States included for the various diseases are as follows Typhoid fever, 48, poliomyelitis, 48, meningococcus meningitis, 48, smallpox, 48 , measles, 47, diphtheria, 48, scarlet fever, 48, influenza, 44 States and New York City The District of Columbia is counted as a State in these reports.

TABLE 1.—*Influenza cases reported in each geographic area during 1936, with corresponding data for the corresponding periods in the 2 preceding years*

Year	Week ended—											
	Jan. 4	Jan. 11	Jan. 18	Jan. 25	Feb. 1	Feb. 8	Feb. 15	Feb. 22	Feb. 29	Mar. 7	Mar. 14	Mar. 21
Total: [1]												
1936	1,786	2,561	3,007	2,547	3,025	4,577	9,077	11,870	11,515	11,746	10,163	10,118
1935	6,965	10,028	7,949	9,673	10,252	9,530	8,591	7,018	5,727	7,080	3,744	2,955
1934	2,051	2,804	1,943	2,201	2,714	2,819	3,825	3,683	3,341	2,971	2,754	2,193
New England and Middle Atlantic:												
1936	62	37	59	90	31	78	118	108	163	229	200	168
1935	641	622	288	123	144	83	73	63	95	250	61	36
1934	83	63	65	99	62	71	53	48	90	50	58	45
East North Central:												
1936	115	146	227	133	226	174	231	290	291	279	269	191
1935	394	1,436	578	673	1,195	416	585	335	573	280	321	146
1934	143	250	163	166	301	236	329	346	284	198	298	166
West North Central:												
1936	160	249	248	262	217	266	362	440	704	697	1,032	1,178
1935	556	442	725	530	626	765	898	531	533	296	285	155
1934	27	30	46	69	73	97	336	261	226	230	207	276
South Atlantic:												
1936	575	803	963	676	1,197	1,729	2,551	2,860	4,135	3,162	2,592	2,081
1935	3,514	4,861	3,051	3,586	2,783	2,398	2,096	1,489	1,353	1,229	983	457
1934	1,102	809	926	1,088	1,211	943	1,232	1,271	1,016	1,027	905	714
East and West South Central:												
1936	646	1,125	1,230	1,087	1,036	1,584	1,675	2,774	3,930	4,754	4,450	4,830
1935	1,558	1,859	2,038	3,122	3,150	4,400	3,998	3,707	2,472	4,831	1,671	1,806
1934	568	1,542	665	677	935	1,317	1,711	1,567	1,531	1,316	1,118	842
Mountain and Pacific:												
1936	228	201	280	299	318	746	4,140	5,458	2,292	2,625	1,620	1,670
1935	302	803	1,269	1,639	2,354	1,473	940	893	701	644	523	233
1934	128	110	78	102	132	155	164	190	194	155	168	148

[1] Mississippi, Nevada, New York, Pennsylvania, and Virginia are excluded, as comparable data are not available. New York City is included.

Meningococcus meningitis.—This disease, which for more than a year has been at a relatively high level, continued to increase during the current 4-week period. The number of cases rose from 800 for the preceding 4 weeks, to 1,172 for the 4 weeks ended March 21. The total was 1.8 times that for the corresponding period in 1935 and more than 5 times the number in 1934. The incidence, however, did not reach the level of 1929, when the peak of several years of high incidence was closely approached during this period and 1,257 cases were reported. The high incidence of that year was followed by several years of gradually declining incidence until a low of 225 cases was reported for this period in 1934.

Table 2 shows, by geographic areas, the number of cases reported for recent weeks in comparison with the experience of the 2 preceding years and also that of the peak year of 1929. In all regions of the country the current incidence has been considerably in excess of that for recent years. During the period included in the table the incidence in the West North Central region dropped below that for the corresponding period in 1935, and in the East North Central region it dropped to last year's level. In all other regions the incidence remained well above that in the 2 preceding years. The South Atlantic and South Central regions were the only ones to exceed the

1929 figures, but in these regions the incidence in 1930 was higher than that in 1929. For the 12 weeks the total for the South Atlantic region was 640, as compared with 104 and 256 for the corresponding periods in 1929 and 1930, respectively. In the South Central regions 719 cases were reported, as compared with 303 in 1929 and 627 in 1930.

TABLE 2.—*Meningococcus meningitis cases reported by weeks during 1936 with comparative data for the corresponding periods in 1935, 1934, and 1929*

Year	Week ended—											
	Jan. 4	Jan. 11	Jan. 18	Jan. 25	Feb. 1	Feb. 8	Feb. 15	Feb. 22	Feb. 29	Mar. 7	Mar. 14	Mar. 21
Total:[1]												
1936	130	174	197	167	178	165	234	223	307	256	312	297
1935	67	70	74	96	127	104	134	160	154	174	159	159
1934	7	13	12	6	11	9	11	9	5	14	8	15
1929	160	213	218	232	268	226	256	196	303	297	332	325
New England and Middle Atlantic:												
1936	22	38	32	38	33	29	40	37	55	58	66	57
1935	12	5	15	10	15	12	10	15	28	27	24	32
1934	10	22	11	17	14	15	12	17	17	9	10	22
1929	31	51	49	52	73	62	61	58	67	65	77	62
East North Central:												
1936	19	27	23	36	32	37	25	28	30	36	35	43
1935	20	18	19	22	25	24	34	37	45	32	44	28
1934	5	4	4	3	3	4	11	13	5	4	3	14
1929	40	50	53	36	51	43	49	48	63	78	89	65
West North Central:												
1936	11	11	17	7	14	19	30	12	21	11	23	14
1935	6	8	3	16	23	8	27	23	22	18	28	22
1934	5	4	4	3	3	4	11	13	5	4	3	14
1929	37	21	31	38	24	32	40	33	46	49	42	63
South Atlantic:												
1936	26	29	30	22	39	32	43	77	111	71	90	70
1935	10	15	15	14	23	23	15	32	23	39	32	27
1934	6	4	9	6	10	4	3	7	4	5	10	10
1929	6	8	6	7	17	6	6	7	7	6	15	13
East and West South Central:												
1936	34	59	75	56	49	33	64	53	67	63	75	96
1935	10	19	14	24	28	22	34	40	25	42	19	28
1934	10	15	11	12	9	9	15	14	9	13	15	14
1929	8	28	34	38	43	27	23	15	20	15	26	27
Mountain and Pacific:												
1936	18	10	20	8	11	15	26	16	17	17	23	17
1935	9	5	8	10	3	6	8	5	4	7	4	8
1934	4	7	7	5	9	7	5	6	7	4	3	5
1929	38	55	45	61	60	56	78	49	100	84	83	95

[1] Exclusive of Nevada.

States in which the disease has been most prevalent in the current period are Kentucky (146 cases), Virginia and New York (116 each), Illinois (73), Maryland and Tennessee (60 each), Ohio (47), Georgia (44), Pennsylvania (43), Massachusetts (40), and Oklahoma and Texas (31 each).

Smallpox.—For the country as a whole smallpox continued at a high level. However, the high incidence was still confined to the North Central and Mountain and Pacific regions. The number of cases reported from the South Atlantic and South Central regions was considerably below the seasonal expectancy, and no cases were reported from the New England and Middle Atlantic regions. States

reporting a large number of cases were Kansas (226), Nebraska (127), South Dakota (95), Washington (79), Iowa (71), Illinois (60), and Wisconsin (50). More than two-thirds of the total cases occurred in those seven States. For the entire reporting area 990 cases were reported for the current 4 weeks, as compared with 695, 622, and 810 for the corresponding period in the years 1935, 1934, and 1933, respectively.

Scarlet fever.—The scarlet fever incidence continued to be the highest in recent years. For the 4 weeks ended March 21 there were 35,318 cases reported, which was an increase of approximately 10 percent over the figure for the corresponding period in 1935 and more than 40 percent over the number in 1934. The high incidence was still confined to the West North Central region, where the number of cases (5,902) was about 2.4 times that for the corresponding period last year, and to the Mountain and Pacific sections where the incidence (4,770 cases) was about 1.4 times that of last year. The number of cases reported from the New England and Middle Atlantic regions was slightly above the seasonal expectancy, and in other regions the incidence was about normal for this season of the year.

Diphtheria.—The incidence of diphtheria was the lowest during this period in the 8 years for which data are available and was probably the lowest for all time; 2,139 cases were reported for the 4 weeks ended March 21, 1936, as compared with 2,533 for the corresponding period in 1935. The West North Central region reported a slight increase (about 10 percent) over the figure for this period last year, but all other regions reported decreases ranging from 10 percent in the South Atlantic and South Central regions to almost 40 percent in the East North Central region.

Poliomyelitis.—Poliomyelitis stood at about the average level for recent years. For the current 4-week period 78 cases were reported, as compared with 93, 73, and 50 for the corresponding period in the years 1935, 1934, and 1933, respectively. In the New England and Middle Atlantic and the South Central regions the disease was slightly more prevalent than at this time last year; in the South Atlantic it was on a level with last year; while in the Mountain and Pacific regions a decrease from last year's figure of about 40 percent was reported.

Typhoid fever.—Typhoid fever continued at a low level, during the 4 weeks ended March 21, with 362 cases reported, as compared with 385, 508, and 545 for the corresponding period in the years 1935, 1934, and 1933, respectively. Ohio, reporting 45 cases for the week ended March 21, raised the incidence in the East North Central region about 75 percent above that for the corresponding period in 1935, but in other regions the current incidence either closely approximated that of last year or fell considerably below it.

Measles.—The number of cases of measles rose from about 29,000 for the preceding 4 weeks to approximately 44,000 for the 4 weeks ended March 21. While the expected seasonal increase was apparent in all sections of the country, the number of cases was only about 35 percent of the number reported for the corresponding period in each of the 2 preceding years. Measles, however, was unusually high in both of those years and the current incidence was considerably below the average for more "normal" measles years (1929–33, inclusive). In the Mountain and Pacific regions the incidence still remained the highest in recent years, but in other regions it stood at about the normal seasonal expectancy.

Mortality, all causes.—The average mortality rate from all causes in large cities for the 4 weeks ended March 21, as reported by the Bureau of the Census, was 14.2 per 1,000 inhabitants (annual basis). The current rate is the highest recorded for this period since 1929, when the rate for the corresponding period was 14.8. The average rate for the years 1930 to 1935, inclusive, was 13.0. During this period in 1929, influenza and meningitis were both high, and the current high rate appears to be attributable to the same diseases, particularly to influenza.

THE HISTORY AND STUDY OF LEPROSY IN HAWAII

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The Hawaiian Islands, formerly called the Sandwich Islands, are situated about 2,400 miles (less than 5 days' voyage by the fastest boats) southwest of San Francisco. Six islands make up the greater part of the 6,407 square miles of the total area, which is about two-thirds the area of the State of Vermont. The characteristic topography of each principal island is a central mountainous ridge, furrowed by short valleys. During most of the year northeast trade winds cool the islands sufficiently to make the perpetual summer easily tolerated. The raising and processing of sugar cane and pineapples constitute the chief industries. In 1930 the population was 368,336, slightly greater than that of Vermont. In order of numerical strength, the conglomerate racial mixture is chiefly Japanese, Filipino, Caucasian, part-Hawaiian, Portuguese, Chinese, Hawaiian, Porto Rican, and Korean.

Authentic history of the islands began in 1778, when Capt. James Cook came upon them while crossing the Pacific. The natives were similar to those living in the islands of the southern Pacific, and the state of civilization at that time may be roughly compared with that found by Columbus in the West Indies. About 20 years after Cook's first visit, an ambitious leader, Kamehameha, conquered

the principal islands and set up a monarchy. New England missionaries, who came in 1820, in addition to teaching Christianity, did much to shape the economic and social life of the natives. A monarchial system of government continued, with limitations and modifications, until it was overthrown and a provisional government set up by a bloodless revolution in 1893. After 5 years of maneuvering by the provisional government, the Congress of the United States adopted a treaty of annexation, and in 1900 officially accepted the islands as the Territory of Hawaii.

The geographical location of Hawaii gives it importance to the public health of the United States. The phrases "Hub of the Pacific" and "Crossroads of the Pacific" are not mere slogans of the commercial enthusiasts. Ships sailing from North America to the Orient, Philippines, and Australia usually stop at Honolulu; thousands of tourists stop over in Honolulu or make it their destination of a voyage from the mainland, and Army and Navy personnel numbering about 15,000 is constantly being shifted to and from the mainland.

At this center of mid-Pacific travel, leprosy is still prevalent; 557 cases are now segregated and approximately 150 cases are paroled as arrested. If a similar rate prevailed in the United States, the National Leprosarium at Carville, La., would have 200,000 patients instead of 400! While the spread of leprosy from Hawaii to the United States will probably never become serious, it nevertheless furnishes a focus of the disease in a territory commercially close to the mainland.

The origin of leprosy in Hawaii is not definitely known. According to Mouritz (1) there is no Hawaiian word for leprosy. The phrase "Mai pake", or "Chinese sickness", suggests Oriental origin. The mixed crews from the ships that visited the islands after Cook's voyage, or the Hawaiians who went to the Orient during the same period, might have introduced the disease. It might have been endemic among the aborigines and reached epidemic proportions in later years. Between 1835 and 1845 several cases of probable leprosy were recorded. In 1848 Dr. Hillebrand, a German physician, observed leprosy in Chinese coolies. Regardless of the uncertainty of its origin, leprosy was sufficiently prevalent to cause the legislature, under King Kamehameha V, to enact a law on January 3, 1865, which provided for the apprehension and segregation of all people affected with leprosy. Considering the status of preventive medicine at the end of the Civil War, and the fact that Hansen, in Norway, had not at that time discovered the bacillus of leprosy, the Hawaiian Board of Health should be congratulated for its early efforts to control a widespread communicable disease by separating the sick from the well.

During the 70 years since the passage of the segregation act, through the vicissitudes of a decaying monarchy, a successful revolution, and a new government as a territory of the United States, the law has

been enforced with varying degrees of effectiveness. Altogether between 7,000 and 8,000 people have been segregated and maintained at considerable public expense. The total number in segregation gradually increased to approximately 1,100 in 1895, with a subsequent slow decrease to the present number of 557. The annual rate of admission for the Hawaiian race, which was between 4 and 5 per 1,000 population in the decade 1880–90, has dropped in recent years to approximately 1.5 per 1,000. The combined Hawaiian and part-Hawaiian rate is now less than 1 per 1,000. Most of the immigrants, brought in great numbers to Hawaii for employment on the plantations, came from countries in which leprosy was prevalent, thereby aggravating the local problem. It is impossible to evaluate the part that segregation has played, and the parts that other factors, such as social and economic changes, have played in bringing about the decrease.

The practical plans for segregation originally provided for a small treatment hospital and detention home readily accessible to Honolulu, and an asylum for more advanced cases at a place where segregation could be easily enforced.

On November 13, 1865, a small treatment hospital was opened in the Kalihi district, on the island of Oahu, about 3 miles from central Honolulu. After 10 years it was abandoned because of its cost, failure to isolate, and inability to effect cures. The cases for detention awaiting transfer were then kept near the Honolulu police station. On December 12, 1881, a new treatment hospital and detention home was opened, less than 1 mile from central Honolulu in the Kakaako district. After 8 years it also was abandoned. Another receiving station was later opened in the Kalihi district and is still in operation.

An ideal place for a leprosy settlement was found on the island of Molokai, on a peninsula of approximately 10 square miles, separated from the remainder of the island by sheer mountainous cliffs. The Hawaiian Government bought a portion of this site. The settlement, named Kalaupapa, from a part of the peninsula, began with the landing of 25 cases of leprosy on January 6, 1866. Later the entire site was obtained by the Government.

The earnest desire of the territorial board of health to get scientific help in its leprosy problem resulted in the employment of Dr. Edward Arning, a German physician, who, in 1883, began investigations of leprosy in the Kakaako hospital. His report to the board, after 2 years, showed that he had made commendable progress. Unfortunately a misunderstanding between him and his employers over some parts of his report caused his resignation and terminated what might have been a valuable chapter in the history of Hawaiian leprosy. Further desire of the local officials to obtain information on leprosy prompted them, in 1885, to send a questionnaire on the subject to the

medical representatives of those nations in which leprosy was prevalent.

Several events have been outstanding in the history of leprosy and of the control of the disease in Hawaii, two of which will be briefly mentioned.

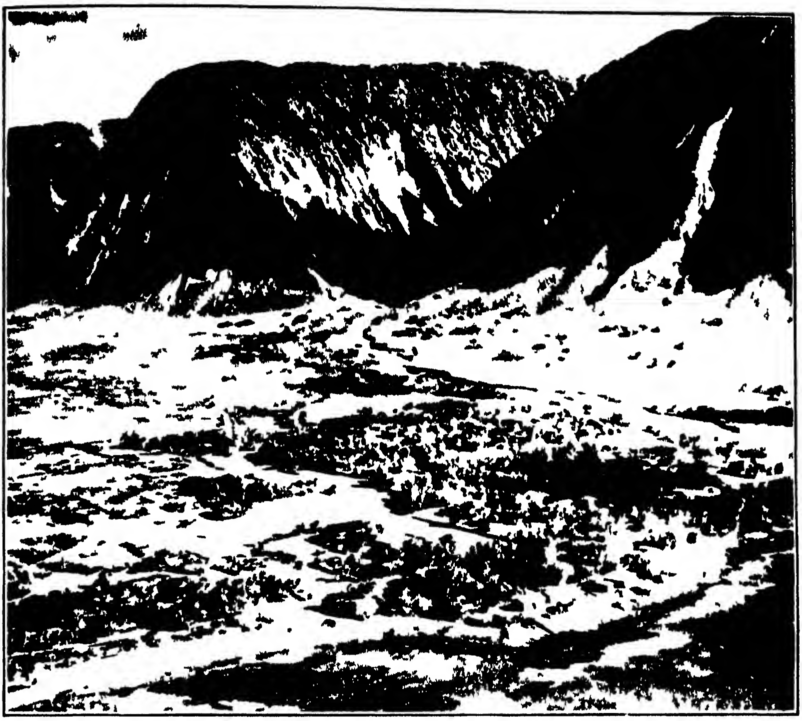
Father Damien.—Joseph Damien de Veuster, Belgian, at the age of 34, began duties as a Catholic priest at Kalaupapa in 1873. After 5 years of fearless, and apparently careless, association with leprosy, he developed symptoms which presented visible signs of leprosy by 1884, and died with nodular leprosy in 1889. The circumstances surrounding this case helped to settle the local argument on the communicability of the disease.

Inoculation of Keanu.—In 1884 Dr. Arning obtained royal consent to inoculate with leprosy a convicted murderer, Keanu, whose death sentence on that account was commuted to life imprisonment. A leprous nodule was transplanted beneath the skin of Keanu's right forearm. Twenty-five months later he showed signs of generalized nodular leprosy and died at Kalaupapa about 6 years later. The value of the experiment was weakened, however, when it was learned that he had once lived with leprous relatives.

Many tragedies have been reported in the early efforts to control leprosy in the islands, involving the killing of officials and a physician in their attempts at apprehension and segregation of leprous persons.

LEPROSY INVESTIGATIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE IN HAWAII

In 1904, approximately 4 years after the annexation of the Territory of Hawaii, Dr. C. B. Cooper, president of the territorial board of health, presented a résumé of the status of leprosy in Hawaii to the second annual conference of state and territorial health officers with the Surgeon General of the United States Public Health Service. Dr. Cooper requested the Federal Government to recognize the significance of leprosy in its newly annexed territory by beginning scientific investigation of the disease. During the same year the American Medical Association passed a resolution similar in purpose to the request of Dr. Cooper. The pleas were acted on promptly by Surgeon General Wyman of the Public Health Service. He presented the matter to Congress and a bill was signed by the President on March 3, 1905, appropriating $100,000 for a hospital and laboratory at Kalaupapa, Molokai, and $50,000 for annual upkeep. On June 7, 1905, Surgeon General Wyman arrived at Honolulu to make the necessary preliminary arrangements. Kalawao, east of Kalaupapa Settlement, but on the same peninsula, was selected as a site for transfer by the Territory to the Federal Government.



KALAUPAPA SETTLEMENT ON A SMALL PENINSULA OF MOLOKAI BETWEEN THE MOUNTAINS AND THE SEA

KALIHI HOSPITAL—PART OF INFIRMARY

PLAYGROUNDS, CENTRAL DINING HALL, AND KITCHEN, KALIHI HOSPITAL.

A SPREADING MONKEY-POD TREE IN THE CENTER OF THE COMPOUND AT KALIHI HOSPITAL, WITH THE TELEPHONE BOOTH UNDERNEATH.

In spite of the ready response on the part of the Federal Government to begin leprosy research in Hawaii, more than 4½ years elapsed before the station at Kalawao was formally opened. Local prices were high, and some materials had to be shipped from the mainland; and as the local contractors refused to undertake the construction work for the amount appropriated, an official of the Federal Government undertook the job and built the station with such skilled and unskilled labor as was available. Additional appropriations for a landing pier and water supply had to be made by Congress. Finally, on December 23, 1909, the Kalawao Investigation Station was opened.

Notwithstanding the building difficulties encountered at Kalawao, the Public Health Service had proceeded with its investigations of leprosy. Dr. Walter B. Brinkerhoff, from the department of pathology, Harvard Medical School, was appointed director on March 2, 1906. He established a temporary laboratory at the United States Quarantine Station in Honolulu, and later did some work at Kalihi Receiving Station. A small but comprehensive library was obtained and a bibliographical index of leprosy was begun.

The early investigations were directed at fundamental problems. Some of the studies consisted of attempts to culture the leprosy bacillus, efforts to reproduce the disease in animals, trials at preparation of a diagnostic substance similar to tuberculin, investigation of possible modes of transmission, preparation of vaccines from other acid-fast bacilli, and endeavors to produce a complement-fixation test Rats inoculated with rat leprosy were sent from San Francisco in order that a disease of rats similar in many respects to human leprosy might be reproduced in a colony at the station. Chaulmoogra oil was tried in several cases.

The station at Kalawao was short lived. Patients suitable for study were often unwilling to go to the Federal Hospital. Employees were difficult to obtain and keep at a relatively inaccessible leprosy settlement. The local legislature passed a law on April 14, 1909, which provided for the keeping of most cases of leprosy at Kalihi Receiving Station for a period of at least 6 months before transfer to Kalaupapa. With the recently apprehended patients remaining at Kalihi for treatment, the Public Health Service did not have available for study at Kalawao the more instructive early cases. In 1910 the territorial board of health gave the Public Health Service laboratory space at Kalihi Receiving Station, to which the majority of the personnel was transferred from Kalawao, and 4 or 5 years later all personnel was brought to Honolulu. Since 1914 medical officers of the Public Health Service, when on duty at the leprosy investigation station, have furnished medical attendance to the patients of Kalihi Hospital. The officers have had an excellent opportunity to see and study most phases of leprosy in a hospital environment rather than

under the less adequately controlled conditions found in an asylum village.

Chaulmoogra oil.—Chaulmoogra oil has been employed in the treatment of leprosy for an undetermined period of time. According to Tomb (2), an Egyptian leprologist, Tortoulis Bey, first used the drug by injection in 1894. In 1907 another Egyptian, Engel Bey, had Hoffman and Taube, German chemists, prepare ethyl esters of chaulmoogric acid, which he used in treating leprosy and on which he reported favorably in 1909. The product was marketed as antileprol, but apparently was not extensively used.

In 1915 the Public Health Service reported on the use of chaulmoogra oil by injection, holding the opinion that the drug was useful in some cases. On account of the irritation resulting from the injection of chaulmoogra oil, during the fiscal year 1918 the Department of Chemistry of the College of Hawaii aided the officers of the Investigation Station by preparing esters of chaulmoogric acid. A local physician, Dr. J. T. McDonald, an acting assistant surgeon of the United States Public Health Service, while directing the leprosy investigation station from September 26, 1918, to March 31, 1921, energetically pursued the use of esters of chaulmoogric acid in treatment with apparently encouraging results. At one period practically all patients at Kalihi were receiving injections of esters. Many patients were released on parole and some were discharged as "cured". The enthusiasm became world-wide. Samples of the drug were requested from most countries where leprosy was prevalent. The natural tendency of leprosy to improve or become spontaneously arrested in many cases makes the evaluation of treatment very difficult. Subsequent studies by officers of the Public Health Service have failed to show that the esters of chaulmoogric acid are of specific value. Some leprologists still appear enthusiastic over the drug, but an increasing number are becoming doubtful of its value. The emphasis on treatment induced by the chaulmoogra "cure" has undoubtedly delayed fundamental research here and elsewhere.

Recent investigations.—During recent years investigations have been directed principally toward (*a*) the epidemiology of leprosy, (*b*) its relationship to tuberculosis, (*c*) repeated close clinical observation of the Kalihi patients, (*d*) minute study of the incipient case for neurological signs which might aid earlier diagnosis, (*e*) the study of rat leprosy, and (*f*) the, as yet, unsuccessful attempts to grow on artificial media the bacilli of human and rat leprosy.

Kalihi Hospital today.—The Kalihi Receiving Station, or Hospital, maintains a census which fluctuates between 100 and 125, as new patients are brought in and more advanced cases are sent to Kalaupapa. A modern infirmary of 44 beds cares for the more acutely sick patients and those with concurrent affections. The ambulatory

patients live in roomy, one-story dormitories. The patients in whom the leprosy bacilli have not been demonstrated or have been demonstrated infrequently are separated from those in which the organism is more readily found. A school, a chapel, and a moving-picture hall aid to break the monotony of segregation. Friends and relatives visit the patients freely; two fences placed several feet apart prevent contact. The morale is good and the patients are cheerful. Segregation is seldom violated, although a low wire fence forms the only obstacle to escape.

The clinical picture.—The young medical officer detailed here has an excellent opportunity to study both the clinical and laboratory aspects of a pleomorphic systemic disease which, in its later stages, may give the text-book picture of advanced leprosy, but earlier may rival syphilis in its mimicry. All cases are followed carefully, and the patients are examined frequently with a minimum of clothes under direct overhead daylight. The investigator learns by daily experience that the disease is very different from the concept he formed in school, and many surprises are in store for him.

His ideas of incipient leprosy will be greatly changed. He will probably have the opportunity to see several cases in which the diagnosis may have been made on early neurological signs with very slight or no skin lesions and probably negative bacteriological findings. The early neurological signs referred to consist of slight drooping of a lower lid or side of the upper lip, slight loss of tone or atrophy of one or several small muscles of the hand, more frequently first interosseous, moderate enlargement of a peripheral nerve, usually ulnar or great auricular, and an area of skin perhaps not as large as a silver dollar with absent or depressed sensibility. He will also see some incipient cases develop into well-advanced leprosy.

Another striking characteristic of the disease is its changeability. Lesions may appear singly or generally, develop, and perhaps disappear within a period of a few days or weeks. Some lesions may be developing while others are receding. Acute palsies may occur, and, later, function may be completely restored. All skin lesions may disappear entirely, leaving only faint scars to mark their former sites, but with the bacilli still persisting in the mucous membrane of the nose. Some improve until the disease is arrested, and they are then paroled. The disease may remain quiescent or exacerbations may develop later. Other cases get progressively worse through stages of increased activity, followed by periods of lessened activity.

The so-called "acute reaction" impresses the young officer. A patient who has been going along quietly may suddenly show redness, swelling, and even vesiculation of all lesions. With or without chills the temperature may rise to 104° or more, and for several days the patient is acutely ill. Defervescence and improvement may follow,

the lesions scale, wrinkle, pigment, subside, and the patient resume his usual activities once more. A similar reaction may occur but without fever.

Treatment.—Treatment at Kalihi Hospital is very similar to that practiced in the general care of tuberculosis, emphasizing rest, food, and good hygiene. Patients with acute cases are given bed rest in the infirmary. Symptomatic remedies are prescribed as indicated. Individual lesions respond in many cases to an inflammatory reaction set up by carbon dioxide snow or the injection of an irritant such as esters of chaulmoogric or other fatty acids.

Kalaupapa Settlement at present.—The more advanced and crippled cases of leprosy are given asylum care at Kalaupapa; therefore from a clinical viewpoint the inmates do not exhibit the more interesting and instructive phases found earlier in the course of the disease.

The writer has not visited the Settlement. Official reports and photographs furnish the sources for the following description.

The Kalaupapa Settlement should not be confused as being identical with the island of Molokai. As previously mentioned, the Settlement occupies a small peninsula separated from the remainder of the island of Molokai by sheer mountainous cliffs 1,600 to 2,000 feet in height. The area of the island is about 260 square miles, of which approximately 10 square miles are used for the Settlement. The inhabitants of the remaining 250 square miles go about their agricultural activities undisturbed by the adjacent colony.

The only route available for land travel between the Settlement and other parts of Molokai is a precipitous mountain trail. It is necessary for steamers from Molokai to Kalaupapa to disembark passengers and cargo into small boats, which, during certain periods of the year, may upset in the rough surf. A recently constructed landing field allows transportation from Honolulu by special plane. Patients have not yet been transferred by airplane.

The small tropical peninsula which projects into the Pacific has a massive background of green mountains, which give scenic beauty to those who must live in the village. To the casual observer the community appears much as other rural villages. Of course there are more crippled and deformed people than seen in the usual village, and children are absent. The people live in small communal groups or in individual cottages. Marriage is permitted, but children are removed to territorial homes in Honolulu. A number of well people live with their diseased mates or relatives as "kokuas", or helpers. The village has a store, post office, courthouse, moving-picture theater, and jail. Several churches administer to the spiritual needs of the people. There are approximately 90 automobiles in the Settlement. The inhabitants may, if they wish, raise vegetables, poultry, hogs, or cattle for sale to the Territory for use in the village. Facili-

ties for swimming and fishing are readily available, and these sports are enjoyed by inhabitants of the colony.

The Settlement is completely financed by the Territory and administered by a lay superintendent under the Board of Hospitals and Settlement. During the past few years many new buildings and much modern equipment have been provided. Two full-time physicians employed by the board furnish medical care, and there is a modern 50-bed hospital for the patients needing hospital care. A dentist divides his time between Kalihi and Kalaupapa.

Cooperation between the Public Health Service and the Territorial authorities.—During the 30 years that the Public Health Service has been engaged in the study of leprosy in Hawaii, there has been a splendid spirit of cooperation between its officers and the Territorial authorities. Officers of the Public Health Service either on duty at the investigation station or sent to the islands for the special purpose have freely consulted with and advised the local authorities on matters concerning leprosy and other public health problems. As a recent concrete example of that relationship, the 1928 report of the president of the board of health carries specific recommendations made by the director of the United States Leprosy Investigation Station to the effect that the handling of leprosy should not be by segregation alone but also by following up the relatives and contacts and by attempting to reestablish the paroled patient in his community. These and other recommendations are now being carried out in the new program of the Board of Hospitals and Settlement.

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DERMATITIS FROM WRIST-WATCH STRAPS

By Louis Schwartz, *Senior Surgeon, United States Public Health Service*

A large manufacturing concern which had been in business for many years suddenly began to receive complaints that straps on their watches were causing dermatitis; and by the end of 6 months, during which time about 125,000 watches were furnished with straps, more than 50 complaints were made to the company by people who developed dermatitis from wearing the straps.

It has been customary in this plant for a period of years to test samples of their wrist watches for running and wearing qualities on volunteer workers in the plant. No cases of dermatitis had been noted among these volunteers before the present complaints and the resulting investigations began. After the complaints began to come

in, 50 workers were given wrist watches and straps to wear from the same lot as those from which the complaints were received. Among these 50 were those workers who had been found by previous tests to be most susceptible to skin irritation. After wearing them for 2 or 3 weeks, six of these volunteers developed dermatitis under the straps. The dermatitis varied in severity from erythema and a few vesicles to a severe inflammation which spread up the arm; but in no case was the dermatitis severe enough to cause the worker to lose time from work.

TRACING THE LEATHER TO ITS SOURCE

The investigation brought out the fact that the cases of dermatitis were all caused by a batch of straps different from those used before. The watch company bought the straps from a firm located in another city. This firm was visited and it was found that in the manufacture of these straps they had used a lot of about 200 dozen chrome-tanned calfskins which they had purchased from a jobber located in another city. They dyed and lacquered the skins and then made them into wrist-watch straps. Previously they had bought leather that had already been dyed and needed only to be lacquered before being made into straps.

The jobber from whom the strap manufacturer purchased the leather was next visited. He stated that the leather was chrome-tanned calf that had been given a ground dye of a russet color, and he gave the name of the factory in which the leather was made. He also furnished a skin he had remaining from the lot. The leather tannery located in a distant State was visited. They identified the leather as having been tanned in their factory 7 years previously and gave a brief description of the method of tanning.

METHOD OF TANNING

The hides were first soaked in water and softened and then placed in a vat containing lime and sodium sulphide in solution, in order to remove the hair, after which they were washed in water and exposed to the action of powdered pancreas ("bated") to remove the superficial keratin layer. They were then placed in a dilute solution of sulphuric acid (pickled) to neutralize the "bate." Next they were placed in a tanning solution consisting principally of a solution of potassium bichromate. After this the excess fat on the under side was removed (fleshed) and a fat liquor was rubbed in to replace the fat taken out by the tanning process. The fat liquor consisted mostly of neat's foot oil. The ground dye, a wood dye, was applied at the same time. The leather manufacturers stated that it was a good grade of chrome-tanned leather, but was not intended to be used for wrist-watch straps.

METHOD OF MANUFACTURE OF THE STRAPS

The firm manufacturing the straps stated that in August of 1934 they had a demand from the watch company for a strap that would be a fast black and sweat proof. Previous to this, as before noted, they had bought leather already dyed and simply put on a clear lacquer spray; but as this leather was not satisfactory to the watch company, they purchased a lot of a good grade of chrome-tanned calf, which they prepared as follows: The leather was folded rough side to rough side and cemented together with a cold patching cement. After this operation the leather presented two smooth sides. It was then dipped and allowed to stand for 3 minutes in a dye solution consisting of a mixture of denatured alcohol, lacquer thinner, and two types of black dye. After being taken out of the dyeing solution, it was hung up to dry for about 6 hours and then sprayed on both sides with a mixture of black lacquer and the same thinner that was used in the dyeing process. The leather was then allowed to dry, after which it was cut up and stamped into wrist-watch straps, the edges of which were again lacquered with the same lacquer solution. Two types of black dye were used in the dyeing solution. This was done because dyeing the leather with the first black dye imparted a blue-black color which was undesirable, and the other black dye was added to give a pure black dyed strap.

CHEMICALS USED

The chemicals used in this process were purchased from a chemical manufacturing company located in another State. A visit was made to this firm and the chemists were interviewed. The ingredients of the lacquer, the thinner, and the dyes were ascertained and samples of each obtained. The ingredients of these were as follows:

Dye 1

Wood alcohol.
Butyl alcohol (normal).
Amyl Black.

Dye 2

Wood alcohol.
Butyl alcohol (normal).
Amyl Black.
Oil Yellow T.

Lacquer

Butyl acetate.
Toluol.
Nitro cellulose.
Ethyl acetate.
Butyl alcohol (normal).
Lactol Spirits.
Denatured alcohol 2 B.
Processed castor oil.
Superba Black Pigment.

Thinner

Ethyl acetate.
Butyl acetate.
Toluol.

Amyl Black is the trade name of an oil-soluble dye which is made by the action of stearic acid on nigrosine hydrochloride.

Oil Yellow T is one of the trade names given to amido azotoluene hydrochloride. It is a basic azo dye. (Other names are Fast Oil or Spirit Yellow, Butter Yellow, Amido Yellow T, Fast Azo Garnet Base, Insoluble Orange Yellow O. L. G., and Yellow Fat Colour.)

It is prepared by the action of nitrous acid on an excess of ortho-toluidine and by the isomerization of the intermediate ortho-diazo-amino toluene. It is an orange-yellow powder insoluble in water, but soluble in alcohol and oils. It is used for coloring varnishes, fats, oleomargarine, and wax. If H_2SO_4 is added to an alcoholic solution of the dye, a brown color develops at first, then a reddish color, and finally a reddish precipitate of the sulphate on dilution.

Lactol Spirits is the trade name of a petroleum distillate coming off between 87° and 148° C.

Processed castor oil is prepared by the blowing and oxidation of castor oil.

Superba Black Pigment is a trade name for carbon black.

PATCH TESTS

In order to locate the chemical causing the dermatitis it was decided to do a series of patch tests with the watch straps in different stages of manufacture. Thirty-seven of the 50 employees of the watch company who had worn the straps volunteered for patch testing. Among these were 5 who had contracted dermatitis from wearing the straps.

The patches were as follows:

Patch 1.—A piece of the leather used in the straps, one-half inch square, as it came from the tannery. Reactions to this patch would indicate an irritant remaining in the leather from the tanning process. Absence of reaction to this patch would show that the tanning process was not the cause of the dermatitis.

Patch 2.—A piece similar to patch 1, soaked in the thinner solution for 2 hours and then allowed to dry for 5 days. A reaction to this and not to patch 1, would show that either some irritant which did not evaporate was contained in the thinner, or that the thinner brought to the surface of the leather and left deposited there some irritant from the tanning process contained in the substance of the leather. Absence of reaction to this patch would confirm that there was no irritant in patch 1 and none left on the leather by the thinner.

Patch 3.—A piece similar to patch 1, which had been dipped in the lacquer and then allowed to dry for 5 days. A reaction to this patch and no reaction to patch 2 would indicate that one of the ingredients in the lacquer which was not contained in the thinner was the irritant. Absence of reaction to this patch would eliminate the leather as it came from the tannery, the ingredients of the thinner, and the ingredients of the lacquer as the cause of the dermatitis.

Patch 4.—A piece similar to patch 1, dipped into the dye mixture said to have been used by the strap manufacturer. The leather was allowed to stay in the dye for 5 minutes and then to dry for 5 days. A reaction to this patch with no reaction to patches 1, 2, and 3 would

show that the irritant was one of the two dyes used. The wood alcohol in this solution would evaporate in the time that was allowed for the leather to dry. Absence of reaction to this patch would clear the dyes used as the causative factors in the dermatitis.

Patch 5.—This patch consisted of leather dyed as in patch 4, but also dipped in lacquer and allowed to dry for 5 days. Reaction to this patch would confirm the positive reaction to patch 4, and show that the layer of lacquer did not protect the skin from the dye, or would confirm a positive reaction (if such were obtained) from patch 3. A negative reaction to this patch would confirm a negative reaction (if such were obtained) to patch 4, or would show that the film of lacquer protected the skin from the action of the irritant dye, if a positive reaction was obtained from patch 4. If a negative reaction was obtained from patch 3 and a positive reaction from patch 5, it would mean that the dyes were the irritants.

The patches were to be allowed to stay on for 72 hours unless the reaction was so severe that they had to be removed before that time had elapsed.

The reactions to patches 4 and 5 were so severe on one woman that they had to be removed before 18 hours had elapsed, and she became so ill that she had to stay away from work. Before the end of 24 hours, patches 4 and 5 had to be removed from two more volunteers. All three cases had previously contracted dermatitis from the experiment of wearing the wrist-watch straps. Because the factory was closed at the time when it was intended that the patches were to be removed, the remainder of the patches were not removed until 5 days after they had been applied. Nine out of the 37 wearing them showed reactions of varying degrees to patches 4 and 5. These nine showed no reactions to the other patches. The reactions varied from (*a*) an erythema and edema to (*b*) erythema, edema, and vesicles, and (*c*) a vesicular dermatitis spreading from the site of the patch up the forearm as far as the elbow. One case showed an erythema under patches 1 and 2, but no reaction under the other patches. This man was sensitive to the undyed leather. There were no other positive reactions.

The results of these tests showed that the cause of the dermatitis was in the dyes used. The one case reacting to the undyed leather showed only a mild reaction, not comparable in severity to the reactions caused by the dyes. He refused to submit to further patchings to ascertain the chemical in the leather ~~to~~ which he was sensitive.

The next step was to find which of the two dyes was the irritant. Only six of the nine who gave reactions to patches 4 and 5 consented to submit to further patching. The three who refused were the ones who had the severest reactions.

The two dye solutions contained in common, methyl alcohol, butyl alcohol, and Amyl Black; and dye no. 2 had, in addition, Oil Yellow T. It was not necessary to patch with butyl alcohol, because if it had been the irritant, reactions would have been obtained from patch no. 3 (the lacquer) which contained it. (All the solvents used in the dyes, the thinner, and the lacquer may irritate the skin if they are applied in the form of a wet patch, because they are fat solvents; but as they evaporate quickly, they are not present in the dried watch straps.)

Patch A was a piece of the undyed tanned leather one-half inch square, soaked in wood alcohol and then allowed to dry thoroughly. A positive reaction to this would show that the wood alcohol dissolved some irritant out of the leather and left it deposited on the surface.

Patch B was a similar piece of leather dipped in a solution of Amyl Black and the thinner, and allowed to dry thoroughly. A positive reaction to this patch would show that the patient was hypersensitive to Amyl Black.

Patch C was a similar piece of leather dipped in a solution of Oil Yellow T and the thinner, and allowed to dry thoroughly. A positive patch test to this would show that the patient was hypersensitive to Oil Yellow T.

Patch D was a similar piece of leather dipped in the denatured alcohol which was used by the strap manufacturer in mixing the dyes and allowed to dry thoroughly. This patch was applied to determine whether the denaturant in the alcohol would be left on the leather after the alcohol had evaporated and act as an irritant.

The volunteers would not consent to leave the patches on for longer than 24 hours. At the end of that time three of them showed marked reactions under patch C. There were no reactions to any of the other patches. It was thought probable that if the patches had been allowed to remain for a longer period there would have been more reactions to patch C. The day after the patches were removed, a severe delayed reaction to patch C developed on one of those who had been negative. The reactions on the four who had been positive increased in severity and on one of them it spread down to the wrist and up above the elbow. The arm was inflamed, swollen, and painful, so that the subject had to stop work. A week after the patches were removed the sites of all the reactions were still swollen and eczematous.

The two who gave no reactions to these patches were patched a week later with patches B and C, which were allowed to remain on for 5 days. One of the cases showed a marked spreading erythematous, edematous vesicular reaction under patch C. No reaction occurred under patch B. The other subject showed no reactions. He had shown only a mild reaction to patches 4 and 5, and had not contracted dermatitis from wearing the straps.

In order to confirm the fact that the Oil Yellow T was the cause of the dermatitis, nine employees of the strap manufacturing company volunteered to be patch-tested. These workers had handled and dyed the straps but had not contracted dermatitis from them.

Three patches were placed on each of them. Patch 1 consisted simply of the tanned leather; patch 2 was similar to patch B; and patch 3 was similar to patch C. They were allowed to stay on for 5 days and there was one positive reaction to patch C (the leather dyed with Oil Yellow T). There were no other reactions.

It seems conclusive that the Oil Yellow T (used to change the blue-black color of the straps imparted by the Amyl Black to a pure black) was the chemical on the straps which caused the dermatitis among the wearers of the wrist-watch straps.

Amido azobenzene has been known to irritate the skins of workers in dye manufacturing plants. Amido azotoluene is a closely related compound, but no cases of dermatitis have been reported from its use. Amido azotoluene has been recommended for use in promoting the growth of skin on wounds.

Azodermin, a monoacetyl derivative, has been recommended as a nonpoisonous substitute which produces less staining than amido azotoluene.

Pellidol, the diacetyl derivative, is used for the same purpose in a 2-percent vaseline ointment and is said not to stain at all (Kalle & Co. Aktiengesellschaft, Biebrick A. Rhein).

Azodol K. is a mixture of equal parts of pellidol and iodol (tetra iodo pyriole) and is used for the same purpose (Aktiengesellschaft für Anilin Fabrikation, Berlin).

SUMMARY

An outbreak of dermatitis caused by wrist-watch straps was investigated.

The leather was traced to its source and the chemicals used in manufacturing and dyeing the straps were ascertained. Forty-six volunteers were patch-tested with the leather and the chemicals used. Among these were five who had actually contracted dermatitis from wearing the wrist-watch straps.

Ten of them showed positive reactions to amido azotoluene hydrochloride, a dye used on the straps.

Among these 10 were the 5 who had contracted dermatitis from wearing the straps.

One volunteer who did not react to the dyes reacted to the undyed leather used in the straps. There were no reactions to any of the other chemicals.

CONCLUSIONS

Hypersensitivity to amido azotoluene hydrochloride was the cause of the dermatitis among the wearers of the wrist-watch straps. Because about 80 percent of those tested did not react to chrome-tanned leather dyed with amido azotoluene hydrochloride and left on the skin as a patch for 5 days, it follows that such a patch may be left on the normal skin for 5 days without causing a reaction.

Because none of those tested reacted to chrome-tanned leather dyed with an oil-soluble nigrosine left on the skin as a patch for 5 days, it follows that such a patch may be left on the normal skin for 5 days without causing a reaction.

Because only one of those tested reacted to chrome-tanned calf leather left on the skin for 5 days, it follows that such a patch may be left on the normal skin for 5 days without causing a reaction.

The solvents used in dyeing and lacquering the leather had entirely evaporated before the wrist-watch straps were worn and were not the cause of the dermatitis.

RECOMMENDATIONS

Because a considerable percentage of people were found to be hypersensitive to amido azotoluene hydrochloride, it should not be used as a dye on leather to be worn next to the skin, such as leather for wrist-watch straps, hat bands, gloves, or shoes.

Before a manufacturer places on the market leather goods to be worn next to the skin, he should test them on several hundred people, either by actual wear or by patch tests, and if they are found to irritate the skin of even one of the subjects tested, the goods should not be sold to the public.

EDITORIAL NOTE.—Since this report was submitted for publication, Medical Director J. W. Schereschewsky has called attention to the fact that Yoshida of Japan has shown that the dye ortho amido azotoluene, when given in food to rats, as well as when injected subcutaneously, causes a high proportion of primary carcinomas of the liver, and this finding has been confirmed at the U. S. Public Health Service Cancer Investigations Laboratory at the Harvard Medical School. In the experiments conducted at that laboratory, in which the dye was implanted subcutaneously and not given in the food, all surviving animals developed carcinoma of the liver.

In addition, therefore, to being a local irritant causing dermatitis, this dye is a powerful carcinogenic agent, and its use should be prohibited for dyeing anything which may come in contact with the skin.

ORNITHODOROS PARKERI, A NEW SPECIES ON RODENTS[1]

By R. A. Cooley, *Entomologist, United States Public Health Service*

A new species of *Ornithodoros*, described herein, was collected from rodents in June 1934, during field studies being made in the States of Wyoming and Washington under the direction of Bacteriologist Gordon E. Davis and Entomologist Cornelius B. Philip, respectively. The Wyoming material was taken on Poison Spider Creek, 40 miles southwest of Casper, from three ground squirrels (*Citellus* sp., accession nos. 10711, 10716, and 10722), one jack rabbit (*Lepus* sp. number 10718), and one prairie dog (*Cynomys* sp., number 10719) during the period June 7–23. Four of these hosts were infested with one nymph each, the fifth with three nymphs. The Washington material was collected near Yakima on June 22, and consisted of a single nymph from a cottontail rabbit (no. 10143).

Some of the above-mentioned nymphs were subsequently raised to the adult stage under laboratory conditions. The duration of the various feedings ranged from 13 to 50 minutes, the average of 17 feedings being 24.17 minutes. This observation, together with the known habits of other species of this genus, suggested that these ticks might be found in greater abundance in the burrows or nests of the hosts.

With this possibility in mind, further field observations were made in Wyoming in July 1935 by Laboratory Assistant Earl W. Malone. Twenty-five ground squirrel burrows and one nest were examined during the period July 27 to 29, within the same area on Poison Spider Creek which was studied in 1934. Three contained the tick in question; two yielded 44 nymphal and adult ticks each; the third 16 ticks, all stages being represented (nos. 11254, 11260, 11259, respectively). Most of these ticks were found in sand and other litter in a chamber a few feet from the entrance to the burrow. A few were collected from accumulations of sand along the course of the tunnel, while a single nymph was found in the only nest examined (no. 11260). This nest contained also two nymphs of *Ixodes hexagonus cookei*, several lepidopterous larvae, and numerous pseudoscorpions, mites, fleas, and flea larvae.

A single nymph of the same species was taken from a ground squirrel shot 30 miles north of Rock Springs, Wyo., on August 5 (no. 11284).

This *Ornithodoros* is clearly new to science and is related to *O. turicata*. It is being described as *O. parkeri*, in honor of Dr. R. R. Parker, Director of the Rocky Mountain Laboratory, and in recognition of his extended and able studies on *Ixodidae*.

[1] Contribution from the Rocky Mountain Laboratory of the United States Public Health Service, Hamilton, Mont.

Ornithodoros parkeri n. sp.

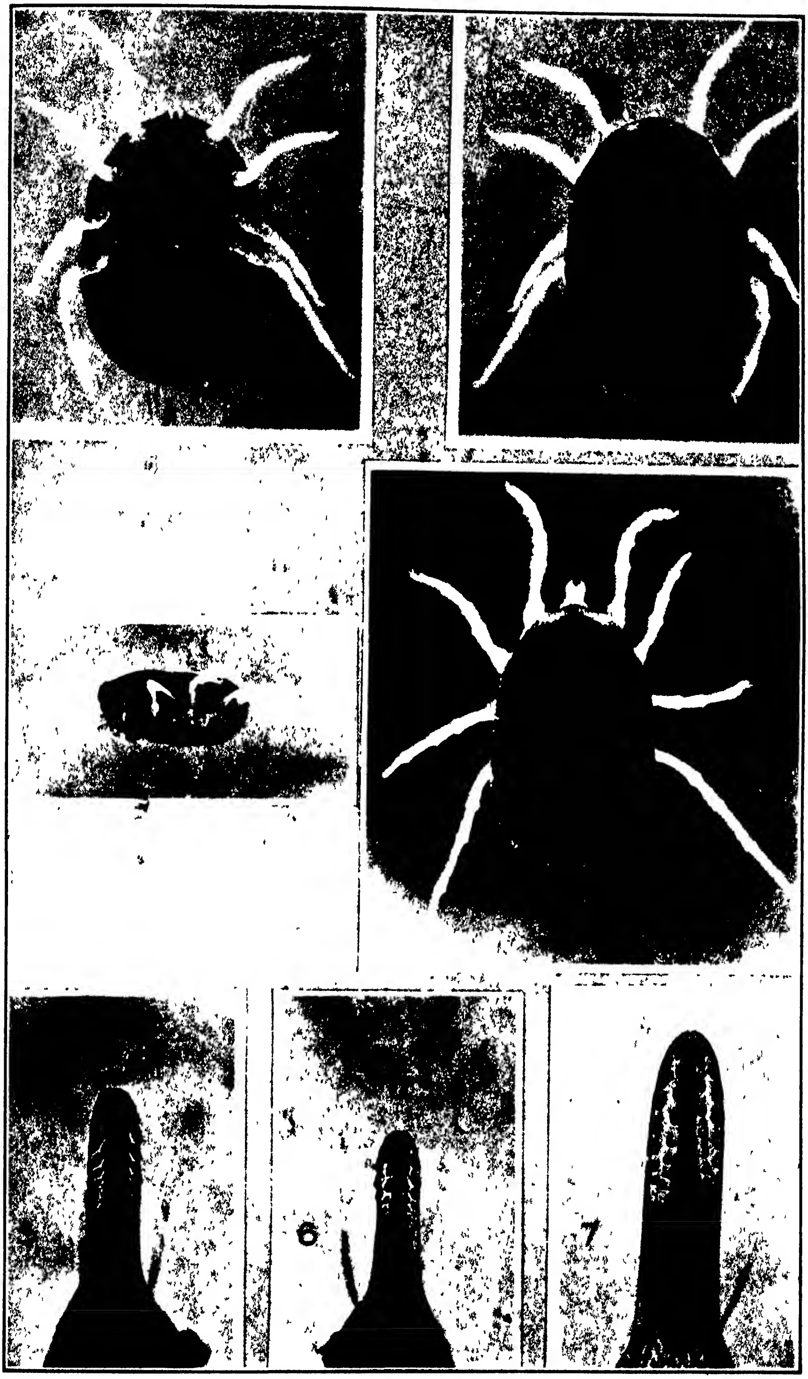
Adult.—Oval, slightly broader posteriorly and slightly pointed at the anterior end; hood visible from above. Length of female, 7.10 mm; width, 4.50 mm. Length of male, 5.75 mm; width, 4.00 mm. Recently emerged adults and nymphs are slate gray in color, and when older they become tinged with light brown. When fully engorged, the color of all the young stage ticks and the adults is influenced by the blood which they contain. When freshly fed, the red of the blood is shown, but in a few days the color becomes darker without definite blood-red in the color. Both dorsal and ventral surfaces are mammillated, the mammillae being larger at the sides and largest of all at the posterior end. Those on the midventral region are the smallest of all. In the mid dorsal region there are about 18 mammillae in a lineal distance of one millimeter, while in *O. turicata*, the species most resembling this one, there are only about 10 mammillae in one millimeter. In both of these species the individual mammillae are smooth on the rounded points or have a single pit on the point, and in a few there is a small clubbed hair arising from the pit. The bases of these mammillae are marked by radiating striae. The average distance between two mammillae is about equal to the diameter of one. Small disk like areas arranged on the dorsum in a bilateral pattern have the actual disks somewhat indefinite. Eyes absent.

Camerastome absent; basis capituli with irregular transverse rugae and a few short hairs at the sides. Hypostome spatulate with a distinct corona which is rounded or slightly flattened at the end, with about 5 or 6 denticles in each of four longitudinal rows and with several denticles less definite proximally. Length of the male hypostome (measured from the bases of the two long hairs at the base to the tip), 0.33 mm; female, 0.40; the length of the hypostome of the last nymphal stage is 0.30 mm (that of a male *O. turicata* is 0.63 mm). The vaginal opening situated just posterior to coxae I; large and with an elevated ring of the body wall encircling it in shrunken specimens. In the last nymphal stages the vaginal scar is definite but smaller and flat, sometimes making it difficult to distinguish them from the adult stage. Grooves on the ventral surface as in related species. Tarsi I and IV with parallel sides; humps on tarsus of leg

Explanation of figures

Figures 1, 2, 3, and 4 in the same degree of magnification. Figures 5, 6, and 7 in the same degree of magnification.

1. *Ornithodoros parkeri*, male, ventral view of holotype.
2. *Ornithodoros parkeri*, male, dorsal view of holotype.
3. *Ornithodoros parkeri*, male, lateral view of holotype.
4. *Ornithodoros turicata*, dorsal view.
5. *Ornithodoros parkeri*, female, hypostome of allotype.
6. *Ornithodoros parkeri*, male, hypostome of holotype.
7. *Ornithodoros turicata*, hypostome of male.



(SEE OPPOSITE PAGE FOR EXPLANATION OF FIGURES)

I not very pronounced, four in number inclusive of the terminal hump; humps on metatarsus five in number; no humps on tarsus IV. Dorsal surface diagonal at the distal end.

Described from seven specimens from lot number 11254 as follows: One male and one female, the holotype and the allotype, respectively, and three males and two females, the paratypes. Male and female paratypes have been deposited in the National Museum, Washington, D. C. The remainder of the type material is in the collection of the Rocky Mountain Laboratory, Hamilton, Mont.

DEATHS DURING WEEK ENDED MARCH 21, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar. 21, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,852	9,022
Deaths per 1,000 population, annual basis	13.8	12.6
Deaths under 1 year of age	590	623
Deaths under 1 year of age per 1,000 estimated live births	53	57
Deaths per 1,000 population, annual basis, first 12 weeks of year	13.7	12.8
Data from industrial insurance companies:		
Policies in force	68,197,513	67,600,038
Number of death claims	15,179	14,055
Death claims per 1,000 policies in force, annual rate	11.6	10.8
Death claims per 1,000 policies, first 12 weeks of year, annual rate	11.0	10.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Mar. 28, 1936, and Mar. 30, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 28, 1936, and Mar. 30, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935
New England States:								
Maine		2	13	27	216	132	0	0
New Hampshire			2		43		1	0
Vermont		1			841	1	0	0
Massachusetts	11	11			1,016	489	8	1
Rhode Island [1]					120	123	2	1
Connecticut	4	7	9	28	79	1,448	3	0
Middle Atlantic States:								
New York	36	28	[2] 22	[2] 18	3,004	2,867	39	23
New Jersey	16	29	40	31	304	1,471	8	2
Pennsylvania [1]	38	36	0		1,337	5,414	10	5
East North Central States:								
Ohio	30	84	242	119	411	2,627	15	14
Indiana	19	14	55	28	10	475	8	6
Illinois	35	67	52	40	51	3,132	17	23
Michigan	12	9	22	6	63	5,103	7	4
Wisconsin	1	6	53	59	88	1,794	1	2
West North Central States:								
Minnesota	3	10	1	1	394	1,341	3	1
Iowa	6	13	5	8	1	1,302	2	1
Missouri	25	39	1,484	118	24	653	9	12
North Dakota	1	3	9	18	3	19	2	0
South Dakota		2		5	2	67	0	0
Nebraska	8	3	1		64	580	1	0
Kansas	17	13	30	23	13	1,785	2	8
South Atlantic States:								
Delaware	2		1	3	49	14	0	0
Maryland [3]	5	3	57	66	204	89	20	6
District of Columbia	14	14	2	4	46	52	10	13
Virginia	16	12	1,213		146	1,127	10	7
West Virginia	13	20	184	42	52	622	9	3
North Carolina [1]	18	10	169	36	83	271	9	1
South Carolina	5	8	533	235	23	32	16	0
Georgia [1]	16	4	585	124			10	0
Florida [1]	3	4	84	14	8	57	8	0
East South Central States:								
Kentucky		12	167	102	105	969	47	6
Tennessee	4	11	540	87	41	142	17	4
Alabama	5	11	1,750	126	18	354	3	3
Mississippi [1] [3]	4	8					5	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 28, 1936, and Mar. 30, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 28, 1936	Week ended Mar 30, 1935	Week ended Mar 28, 1936	Week ended Mar 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar 28, 1936	Week ended Mar. 30, 1935
West South Central States:								
Arkansas	12	1	953	28	15	241	5	3
Louisiana	9	28	279	34	90	99	3	1
Oklahoma [4]	2	5	201	96	10	128	5	8
Texas [1]	38	68	436	345	440	165	24	3
Mountain States:								
Montana	5	2	22	-----	9	457	1	0
Idaho	-----	-----	11	3	10	69	1	0
Wyoming	2	-----	58	-----	21	58	2	0
Colorado	10	9	-----	-----	24	676	0	0
New Mexico	-----	4	43	10	87	17	4	1
Arizona	2	1	202	21	121	27	0	1
Utah [4]	-----	-----	-----	-----	13	8	0	0
Pacific States:								
Washington	1	3	9	3	293	190	0	0
Oregon [1]	2	-----	159	69	416	186	1	0
California	23	38	1,768	77	2,597	1,046	6	10
Total	473	653	11,475	2,054	13,005	37,919	254	173
First 13 weeks of year	7,982	9,445	99,074	91,311	104,857	316,204	2,994	1,652

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 28, 1936	Week ended Mar 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935
New England States:								
Maine	0	1	25	9	0	0	2	2
New Hampshire	0	0	3	12	0	0	0	0
Vermont	0	0	49	6	0	0	0	0
Massachusetts	0	1	299	272	0	0	1	1
Rhode Island [1]	0	0	29	14	0	0	0	1
Connecticut	0	1	102	116	0	0	1	3
Middle Atlantic States:								
New York	0	0	1,116	1,309	0	0	10	7
New Jersey	0	2	541	221	0	0	1	4
Pennsylvania [1]	1	2	571	689	0	0	12	3
East North Central States:								
Ohio	1	3	440	1,270	0	0	71	6
Indiana	0	1	298	161	10	1	0	8
Illinois	0	1	931	1,300	14	0	11	5
Michigan	0	1	397	448	1	0	5	1
Wisconsin	0	0	574	483	6	51	0	4
West North Central States:								
Minnesota	0	1	463	263	13	13	2	0
Iowa	0	0	209	94	17	6	0	4
Missouri	0	0	193	72	16	4	0	2
North Dakota	0	0	75	60	7	2	0	0
South Dakota	0	0	38	23	21	3	0	0
Nebraska	1	0	241	39	35	23	0	0
Kansas	0	0	314	73	30	0	1	0
South Atlantic States:								
Delaware	0	0	3	16	0	0	0	1
Maryland [3]	0	0	99	125	0	0	4	4
District of Columbia	0	0	21	118	0	0	0	0
Virginia	0	0	60	54	0	0	4	3
West Virginia	0	1	44	105	0	0	4	2
North Carolina [1]	3	0	20	31	1	0	5	3
South Carolina	0	0	6	5	0	0	1	0
Georgia [1]	0	0	14	11	1	4	2	6
Florida [1]	0	0	10	2	0	0	1	2
East South Central States:								
Kentucky	0	1	54	47	0	1	0	3
Tennessee	0	0	52	16	1	0	1	2
Alabama	0	0	10	7	0	2	2	6
Mississippi [1,3]	0	0	15	14	0	1	0	10

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 28, 1936, and Mar. 30, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935	Week ended Mar. 28, 1936	Week ended Mar. 30, 1935
West South Central States:								
Arkansas	0	0	19	5	1	2	1	0
Louisiana	0	1	22	5	1	0	2	18
Oklahoma [4]	0	0	24	23	1	0	2	9
Texas [1]	3	2	75	63	2	13	6	6
Mountain States.								
Montana	0	0	129	9	5	0	2	1
Idaho	0	0	118	2	7	0	0	0
Wyoming	1	0	88	16	2	2	0	0
Colorado	0	0	103	260	1	7	0	0
New Mexico	0	0	65	17	1	5	0	3
Arizona	0	0	12	79	0	0	3	1
Utah [3]	0	0	87	108	4	0	0	0
Pacific States:								
Washington	1	0	100	45	19	15	2	2
Oregon [5]	0	0	43	38	1	0	6	0
California	3	7	343	280	1	4	3	4
Total	14	26	8,544	8,495	219	159	168	131
First 13 weeks of year	262	335	101,254	92,435	3,004	2,488	1,415	1,666

[1] Typhus fever, week ended Mar. 28, 1936, 14 cases, as follows: Rhode Island, 1; Pennsylvania, 1; North Carolina, 4; Georgia, 3; Florida, 1; Mississippi, 1; Texas, 3.
[2] New York City only
[3] Week ended earlier than Saturday
[4] Exclusive of Oklahoma City and Tulsa
[5] Rocky Mountain spotted fever, week ended Mar 28, 1936, Oregon, 1 case.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only thos States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January 1936										
Colorado	9	36	2	-------	56	-------	0	920	40	8
February 1936										
California	41	171	11,904	2	7,610	8	16	1,663	5	23
Colorado	9	32	6	-------	54	-------	1	611	62	3
Kansas	7	60	190	-------	51	-------	2	1,068	95	1
Louisiana	11	69	185	41	258	10	2	76	6	10
North Dakota	2	12	18	-------	5	-------	0	401	32	1
Oklahoma [1]	56	40	1,436	15	32	11	2	130	5	10
Tennessee	37	59	1,129	27	311	18	0	175	0	12
Virginia	104	73	9,473	5	385	7	1	218	0	19
Washington	7	7	104	-------	903	-------	1	387	65	6
Wisconsin	10	8	256	-------	337	-------	0	2,219	61	5

January 1936

	Cases
Colorado:	
Chicken pox	655
Impetigo contagiosa	20
Jaundice	2
Mumps	673
Ophthalmia neonatorum	1
Whooping cough	60

February 1936

	Cases
Chicken pox:	
California	2,603
Colorado	513
Kansas	1,069
Louisiana	93
North Dakota	12
Oklahoma [1]	101
Tennessee	273
Virginia	336
Washington	520
Wisconsin	2,017
Dysentery:	
California (amoebic)	6
California (bacillary)	5
Louisiana (amoebic)	5
Oklahoma [1]	4
Virginia (diarrhea included)	193
Epidemic encephalitis:	
California	2
Kansas	2
Oklahoma [1]	1
Washington	5
Wisconsin	2
Food poisoning:	
California	20
German measles:	
California	974
Kansas	15
Tennessee	15
Washington	243
Wisconsin	82
Granuloma, coccidioidal:	
California	2

February 1936—Continued

	Cases
Hookworm disease:	
Tennessee	1
Impetigo contagiosa:	
Colorado	8
Oklahoma [1]	5
Tennessee	6
Jaundice, epidemic:	
California	1
Colorado	2
Leprosy:	
Louisiana	2
Mumps:	
California	1,968
Colorado	786
Kansas	458
Louisiana	69
North Dakota	600
Oklahoma [1]	61
Tennessee	228
Virginia	521
Washington	339
Wisconsin	4,557
Ophthalmia neonatorum:	
California	1
Oklahoma [1]	2
Tennessee	1
Puerperal septicemia:	
Tennessee	1
Rabies in animals:	
California	86
Louisiana	14
Washington	2
Scabies:	
Kansas	1
Oklahoma [1]	7
Tennessee	16
Washington	2
Septic sore throat:	
California	15
Colorado	3
Kansas	9
Louisiana	3
Oklahoma [1]	49

February 1936—Continued

	Cases
Septic sore throat—Con.	
Tennessee	10
Virginia	6
Washington	4
Wisconsin	2
Tetanus:	
California	6
Tennessee	1
Trachoma:	
California	35
Tennessee	3
Washington	58
Wisconsin	3
Tularaemia:	
California	1
Louisiana	7
Tennessee	3
Wisconsin	1
Undulant fever:	
California	16
Colorado	1
Kansas	2
Louisiana	3
Oklahoma [1]	1
Tennessee	2
Virginia	1
Washington	1
Wisconsin	4
Vincent's infection:	
Colorado	3
Kansas	19
North Dakota	2
Tennessee	2
Whooping cough:	
California	711
Colorado	72
Kansas	156
Louisiana	131
North Dakota	22
Oklahoma [1]	61
Tennessee	55
Virginia	108
Washington	72
Wisconsin	520

[1] Exclusive of Oklahoma City and Tulsa.

WEEKLY REPORTS FROM CITIES

City reports for week ended Mar. 21, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	3	1	0	0	1	0	1	22
New Hampshire:											
Concord	0		0	0	1	0	0	0	0	0	7
Nashua	0			2		2	0		0	0	
Vermont:											
Barre	0		0	0	0	0	0	0	0	0	1
Burlington	0		0	22	0	0	0	0	0	3	9
Rutland	0		0	78	1	2	0	0	0	0	7
Massachusetts:											
Boston	0		0	263	38	99	0	5	0	29	248
Fall River	0		2	2	4	15	0	2	0	0	23
Springfield	0		0	1	3	5	0	1	0	2	48
Worcester	0		0	6	9	14	0	0	0	10	64
Rhode Island:											
Pawtucket	0		0	0	0	1	0	0	0	0	15
Providence	0		1	17	7	13	0	3	0	4	70
Connecticut:											
Bridgeport	1	2	1	3	4	2	0	1	0	4	33
Hartford	1		0	1	3	4	0	1	0	0	31
New Haven	0	3	1	0	6	4	0	2	0	35	56
New York:											
Buffalo	0		6	34	16	89	0	10	0	12	138
New York	31	40	18	1,736	201	541	0	72	3	[illegible]	1,738
Rochester	0	89	2	0	13	3	0	0	0	3	87
Syracuse	0		0	41	8	8	0	1	0	6	55

City reports for week ended Mar. 21, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
New Jersey:											
Camden	0	2	2	0	6	6	0	2	0	0	40
Newark	0	18	3	5	19	266	0	6	0	13	106
Trenton	0	------	0	0	4	6	0	2	0	13	40
Pennsylvania:											
Philadelphia	7	23	9	471	70	94	0	27	0	0	623
Pittsburgh	2	9	5	29	27	121	0	8	0	6	186
Reading	0	------	0	6	2	8	0	0	0	3	27
Scranton	0	------	------	4	------	1	0	------	0	0	------
Ohio:											
Cincinnati	1	------	4	9	22	17	0	9	0	1	169
Cleveland	4	97	3	54	33	70	0	17	0	73	243
Columbus	4	2	2	2	9	10	0	3	0	2	87
Toledo	0	------	0	47	7	8	0	3	0	30	75
Indiana:											
Anderson	0	------	0	0	2	4	0	2	0	12	12
Fort Wayne	0	------	2	0	7	3	0	1	0	0	33
Indianapolis	1	------	0	3	15	55	0	5	0	14	123
Muncie	0	------	1	0	2	0	0	0	0	0	18
South Bend	1	------	0	0	2	3	0	0	0	9	17
Terre Haute	0	------	0	0	0	5	0	0	0	0	17
Illinois:											
Alton	1	------	1	2	0	5	0	0	0	0	10
Chicago	6	15	7	20	63	309	0	49	0	234	779
Elgin	0	------	0	0	2	2	0	0	0	1	11
Moline	0	------	0	0	0	13	0	0	0	2	11
Springfield	0	------	0	0	2	23	0	0	0	8	28
Michigan:											
Detroit	11	22	3	35	59	135	1	19	0	198	328
Flint	1	------	0	0	7	15	0	3	0	6	30
Grand Rapids	0	------	0	10	3	7	0	0	0	6	42
Wisconsin:											
Kenosha	0	------	0	0	0	7	0	0	0	3	2
Madison	1	------	0	0	1	11	0	0	0	10	14
Milwaukee	0	1	1	4	9	108	0	1	0	75	116
Racine	0	------	0	3	0	29	0	0	0	1	19
Superior	0	------	0	0	1	14	0	0	0	1	6
Minnesota:											
Duluth	0	------	0	1	1	4	0	0	0	2	29
Minneapolis	1	------	1	167	14	143	0	0	0	17	135
St. Paul	0	------	0	156	7	43	0	2	0	8	66
Iowa:											
Cedar Rapids	0	------	------	0	------	6	0	------	0	3	------
Davenport	1	------	------	0	------	15	0	------	0	0	------
Des Moines	2	------	------	0	------	13	0	------	0	0	34
Sioux City	0	------	------	0	------	9	12	------	0	1	------
Waterloo	1	------	------	0	------	6	0	------	0	0	------
Missouri:											
Kansas City	4	------	14	1	41	46	0	8	0	5	161
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	14	11	3	3	31	78	0	11	1	9	250
North Dakota:											
Fargo	0	------	0	0	1	2	0	0	0	1	12
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	------	0	------	4	0	------	0	0	5
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	0	0	0	11	0	0	0	0	7
Nebraska:											
Omaha	6	------	2	8	14	143	7	2	0	0	74
Kansas:											
Lawrence	0	27	0	0	0	3	0	0	0	0	0
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	------	0	2	5	29	0	0	0	10	40
Delaware:											
Wilmington	0	------	0	1	2	2	0	0	0	2	32
Maryland:											
Baltimore	2	15	3	52	33	41	0	15	1	40	269
Cumberland	0	------	0	0	0	2	0	0	0	0	10
Frederick	0	------	0	0	1	0	0	0	0	0	4
District of Columbia:											
Washington	13	4	1	37	31	19	0	14	1	9	197
Virginia:											
Lynchburg	0	------	3	3	2	1	0	0	0	7	16
Norfolk	0	3	1	0	7	2	0	0	0	3	34
Richmond	1	------	7	0	7	27	0	5	0	0	82
Roanoke	2	------	0	0	5	1	0	1	0	0	27

City reports for week ended Mar. 21, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
West Virginia:											
Charleston	0	9	5	1	8	1	0	0	1	0	30
Huntington	0			0		0	0		0	0	
Wheeling	0		0	10	1	2	0	1	0	0	24
North Carolina:											
Gastonia	0		0	0	2	1	0	0	0	0	7
Raleigh											
Wilmington	0		0	0	1	0	0	0	0	0	15
Winston-Salem	1		0	151	2	1	0	1	0	0	11
South Carolina:											
Charleston	0	50	1	0	2	0	0	1	0	2	22
Columbia											
Florence	0		0	0	2	0	0	1	0	0	16
Greenville	0		0	13	0	0	0	0	0	0	8
Georgia:											
Atlanta	3	81	8	0	17	13	0	7	0	0	100
Brunswick	0	2	2	0	3	0	0	0	0	0	10
Savannah	1	64	0	0	4	3	0	0	0	1	41
Florida:											
Miami	0	3	2	1	2	1	0	2	0	0	27
Tampa	0	4	2	0	3	0	0	3	0	0	41
Kentucky:											
Ashland	0			0	1	0	0		0	7	1
Covington	0		0	2	0	0	0	2	0	1	19
Lexington	0	5	0	1	5	0	0	1	0	0	24
Louisville	2	25	0	11	15	21	0	2	0	4	84
Tennessee:											
Knoxville	0	1	1	22	3	0	0	0	0	0	24
Memphis	0		7	1	23	11	0	4	0	3	114
Nashville	2	2	1	3	9	7	0	2	0	0	57
Alabama:											
Birmingham	1	222	8	0	21	2	0	7	0	1	92
Mobile	0	25	7	0	4	0	0	3	0	0	43
Montgomery	0	5		0		2	0		1	0	
Arkansas:											
Fort Smith	1			0		1	0		0	0	
Little Rock	0	300	0	0	8	3	0	2	0	0	11
Louisiana:											
Lake Charles	0		0	0	2	0	0	0	0	0	3
New Orleans	14	44	10	49	23	10	0	15	1	0	198
Shreveport	2		0	21	14	5	0	3	0	0	56
Oklahoma:											
Oklahoma City	1	20	0	0	8	10	0	0	0	0	54
Texas:											
Dallas	1	6	6	105	11	9	0	5	0	4	70
Fort Worth	2		1	0	9	4	0	0	1	0	49
Galveston	2		0	17	1	0	0	1	0	0	19
Houston	6		6	8	18	2	0	5	0	0	111
San Antonio	4		13	9	11	0	0	9	0	0	76
Montana:											
Billings	0		0	0	3	8	0	0	0	2	13
Great Falls	0		0	0	1	9	0	0	0	1	9
Helena	0		0	0	0	2	0	0	0	0	2
Missoula	0		0	0	0	8	0	0	0	0	4
Idaho:											
Boise	0		0	23	0	5	0	0	0	0	7
Colorado:											
Colorado Springs	0		0	2	0	3	0	1	0	2	16
Denver	0		0	5	13	23	0	1	0	11	81
Pueblo	0		0	0	1	19	0	0	0	7	10
New Mexico:											
Albuquerque	0		2	0	1	17	0	3	0	0	18
Utah:											
Salt Lake City	2		1	10	2	57	1	3	0	2	26
Nevada:											
Reno											
Washington:											
Seattle	0		3	100	10	14	0	5	0	1	98
Spokane	0	4	4	11	8	24	0	0	0	5	50
Tacoma	0		0	24	4	3	1	1	0	0	34
Oregon:											
Portland	0	3	3	91	10	4	2	1	0	3	94
Salem	0	7		6		1	0		0	0	
California:											
Los Angeles	15	50	2	613	17	71	0	25	1	20	341
Sacramento	0		1	9	2	2	0	1	0	13	33
San Francisco	0	3	1	491	10	79	0	11	0	48	165

City reports for week ended Mar. 21, 1936—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	13	4	0
Rhode Island:			
Providence	1	0	0
New York:			
New York	26	6	0
Pennsylvania:			
Philadelphia	1	0	0
Reading	1	0	0
Ohio:			
Cincinnati	4	2	0
Cleveland	3	2	0
Illinois:			
Chicago	9	1	0
Michigan:			
Detroit	6	1	0
Minnesota:			
Minneapolis	2	3	0
Iowa:			
Des Moines	1	0	1
Missouri:			
Kansas City	2	0	0
St. Louis	2	0	0
Nebraska:			
Omaha	1	1	0
Delaware:			
Wilmington	2	0	0
Maryland:			
Baltimore	17	6	1
District of Columbia:			
Washington	4	0	0
Virginia:			
Lynchburg	1	0	0
South Carolina:			
Charleston	0	1	0
Georgia:			
Atlanta	2	1	0
Florida:			
Miami	1	0	0
Tampa	5	1	0
Kentucky:			
Ashland	1	0	0
Louisville	2	1	0
Tennessee:			
Knoxville	1	0	0
Memphis	3	0	0
Alabama:			
Birmingham	2	1	0
Mobile	1	0	0
Arkansas:			
Little Rock	0	1	0
Louisiana:			
New Orleans	2	1	0
Shreveport	0	2	0
Oklahoma:			
Oklahoma City	2	2	0
Texas:			
Galveston	0	1	0
Houston	10	1	0
Colorado:			
Denver	0	2	0
Washington:			
Seattle	0	1	0
Oregon:			
Portland	1	0	0
California:			
Los Angeles	1	2	1
San Francisco	1	1	0

Epidemic encephalitis.—Cases: Bridgeport, 1; Pittsbugh, 1; Columbus, 1; Chicago, 1; Wichita, 1; New Orleans, 1.

Pellagra.—Cases: Atlanta, 2; Memphis, 1; Dallas, 1.

Typhus fever.—Wilmington, N. C., 1; Montgomery, 1; Dallas, 1.

FOREIGN AND INSULAR

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended December 28, 1935.—During the 13 weeks ended December 28, 1935, cases of infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	16,218	Puarperal pryexia	1,408
Ophthalmia neonatorum	932	Scarlet fever	35,451
Pneumonia	10,429	Typhoid fever	391
Puerperal fever	490		

England and Wales—Vital statistics—Fourth quarter, ended December 31, 1935.—During the quarter ended December 31, 1935, 141,060 live births and 122,743 deaths were registered in England and Wales. The following statistics are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar General of England and Wales. The figures are provisional.

Birth and death rates in England and Wales, quarter ended Dec. 31, 1935

Annual rates per 1,000 population:	
Live births	13.80
Stillbirths	.59
Deaths, all causes	12.00
Deaths under 1 year of age	[1] .60
Deaths from:	
Diarrhea and enteritis (under 2 years of age)	[1] 6.10
Annual rates per 1,000 population—Continued.	
Deaths from—Continued.	
Diphtheria	0.08
Influenza	.12
Measles	.04
Scarlet fever	.01
Violence	.53
Whooping cough	.08

[1] Per 1,000 live births.

MEXICO

Torreon—Cerebrospinal meningitis.—According to information dated March 7, 1936, an outbreak of cerebrospinal meningitis has occurred in Torreon, Mexico, where, during the month of February 1936, 10 cases with 7 deaths were reported. Later information states that 4 deaths from cerebrospinal meningitis occurred at Torreon on March 24, 1936. Churches and theaters had been closed.

YUGOSLAVIA

Communicable diseases—February 1936.—During the month of February 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	23	2	Paratyphoid fever	20	
Cerebrospinal meningitis	24	4	Scarlet fever	459	9
Diphtheria and croup	712	72	Sepsis	8	4
Dysentery	9	2	Tetanus	25	11
Erysipelas	252	14	Typhoid fever	393	37
Lethargic encephalitis	2		Typhus fever	80	4
Measles	1,406	38			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for March 27, 1936, pages 349-361. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued April 24, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Brazil—Ceara State—Crato.—A report dated March 25, 1936, states that to date 54 cases of plague with 17 deaths had been reported at Crato, Ceara State, Brazil.

Ceylon—Anuradhapura.—During the week ended March 21, 1936, the first case of plague appeared at Anuradhapura, Ceylon.

India—Karachi.—During the week ended March 14, 1936, five cases of plague with two deaths were reported at Karachi, India.

Smallpox

Argentina.—A report dated March 25, 1936, states that smallpox had been reported in Argentina as follows: One case at Lucas Norte, Entre Rios Province. Smallpox has also appeared at Santa Catalina and Yavi, Jujuy Province, Argentina.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Parana State—Curityba, March 11, 1936, 1 case, 1 death; Jacarezinho, March 3–11, 4 cases, 4 deaths; Jaguariahyva, March 6, 1 case, 1 death; Sao Paulo State—Monte Aprazivel, December 18–30, 1935, 4 cases, 4 deaths; Villa Poloni, December 22–31, 2 cases, 2 deaths; Nipoan, December 23, 1 case, 1 death; Candido Motta, February 19, 1936, 1 case, 1 death; February 20, Sussuhy, 1 case, 1 death; February 21–29, Avare, 3 cases, 3 deaths; Bairro da Cabaceira, 1 case, 1 death; Palestina, 1 case, 1 death; February 24, 1936, Guararapes, 1 case, 1 death; Salto Grande, 1 case, 1 death; February 25, Campos Novos, 1 case, 1 death; March 8, 1936, Araraquara, 1 case, 1 death; March 9, Mococa, 1 case, 1 death; date not given, Agudos, 1 case, 1 death; and Pennapolis, 1 case, 1 death.

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen. R. C. Williams, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 APRIL 17, 1936 No. 16

HISTORY AND FREQUENCY OF SMALLPOX VACCINATIONS AND CASES IN 9,000 FAMILIES

Based on Nation-wide Periodic Canvasses, 1928–31 [1]

By SELWYN D. COLLINS, *Principal Statistician, United States Public Health Service*

CONTENTS

Almost from the time of its introduction by Jenner in 1796, vaccination against smallpox has been an accepted procedure in the prevention of the disease. Although widely advocated by private physicians and health departments and extensively practiced in this and other countries, no considerable mass of data relating to the frequency of vaccination has heretofore been assembled. Data recently collected make possible a rough estimate of the extent of vaccination in the United States.

I. SOURCE AND CHARACTER OF DATA

In the study of illness in canvassed white families in 130 localities in 18 States [2] that was made by the Committee on the Costs of

[1] From the Office of Statistical Investigations, U. S. Public Health Service.

This is the seventh of a series of papers on sickness and medical care in this group of families (1–6). The survey of these families was organized and conducted by the Committee on the Costs of Medical Care; the tabulation was done under a cooperative arrangement between the Committee and the Public Health Service. Committee publications based on the results deal primarily with costs and Public Health Service publications primarily with the incidence of illness and the extent and kind of medical care, without regard to cost. As costs are meaningless without some knowledge of the extent and nature of the service received, there is inevitably some overlapping. The committee staff, particularly Dr. I. S. Falk and Miss Margaret Klem, cooperated in the tabulation of the data.

Special thanks are due to Dr. Mary Gover, who assisted in the analysis, to Miss Lily Vanzee, who was in immediate charge of tabulating the data, and to other members of the statistical staff of the Public Health Service, particularly Dr. W. M. Gafafer and Mr R H. Britten, for advice and assistance in the preparation of the study.

[2] The 18 States sampled and the number of canvassed families were: California, 890; Colorado, 386; Connecticut, 100; District of Columbia, 99, Georgia, 544; Illinois, 463; Indiana, 494; Kansas, 301; Massachusetts, 287; Michigan, 329; Minnesota, 224; New York, 1,710; Ohio, 1,148; Tennessee, 212; Virginia, 412; Washington, 551; West Virginia, 318; and Wisconsin, 290. Further details about the distribution of the canvassed population are included in a preceding paper (1).

Medical Care and the United States Public Health Service, service received from physicians and other practitioners was recorded, whether for illness, immunization, physical examination or other reason. The records of vaccination against smallpox for all persons in the observed population afford data on the frequency of this procedure during a 12-month period covered by periodic canvasses; information was also obtained on the history of smallpox vaccination and cases at any time prior to the study. These records make available data on the status of the observed population with respect to immunity to smallpox acquired by vaccination or by an attack of the disease. Because the probability of vaccination prior to a given date is influenced greatly by the number of years the person has lived, the histories in this study are considered for persons of specific ages.

The composition and characteristics of the group of 8,758 families who were kept under observation for 12 consecutive months in the years 1928–31 have been considered in some detail in the first report in the series (1). These families, including a total of 39,185 individuals, represented all geographic sections. Every size of community was included, from metropolitan districts to small industrial and agricultural towns and rural unincorporated areas. The observed group was similar to the general population with respect to age and sex composition, percentage native born, and percentage married. With respect to income, the distribution was reasonably similar to the estimated distribution of the general population of the United States at the time of the survey.

Every locality included had a visiting nurse and a local health department or some other agency employing a visiting nurse. This condition is inherent in the method of the study which required, among other things, that local visiting nurses from health departments or other agencies make the canvasses of the homes to secure the data. Such communities may be better vaccinated than those without health organizations. On the other hand, the record of vaccinations here considered may be less complete than could be obtained by the examination and questioning of individuals. In this study the report for the whole family was made by the housewife or some other adult female; however, the canvasses were periodic and corrections or additional information could be secured at subsequent visits.

II. HISTORY OF VACCINATION AND CASES AT BEGINNING OF STUDY

VARIATION WITH AGE AND SEX

Figure 1 shows for specific ages the proportion of individuals (*a*) who had been vaccinated at any time, (*b*) who had been vaccinated within the preceding 7 years, and (*c*) who had been attacked by smallpox at

any time (table 1). At no age did more than 5 percent of the individuals give a history of an attack of smallpox. The total population with any known present or past immunity to smallpox, comprising about 70 percent of the adults, consists almost entirely of the vaccinated, with only a small proportion with a history of a case.

TABLE 1.—*History of smallpox vaccinations and cases among persons of specific ages of each sex—canvassed white families in 18 States* [1]

Age in years	Both sexes: Percentage of persons with history of— Vaccination or case at any time	Both sexes: Percentage of persons with history of— Vaccination at any time but no case	Both sexes: Percentage of persons with history of— Vaccination within 7 years	Both sexes: Percentage of persons with history of— Vaccination within 7 years or case at any time	Both sexes: Percentage of persons with history of— Case at any time	Both sexes: Total number of persons considered [2]	Both sexes: Percentage of vaccinations that were done within 7 years	Percentage of persons with history of— Vaccination at any time but no case: Male	Percentage of persons with history of— Vaccination at any time but no case: Female	Percentage of persons with history of— Case at any time: Male	Percentage of persons with history of— Case at any time: Female	Total number of persons considered [2]: Male	Total number of persons considered [2]: Female
All ages	57.4	54.4	23.6	26.6	3.05	37,859	43	53.9	54.7	2.95	3.15	18,573	19,286
Under 6 months	2.1	2.1	2.1	2.1	------	529	100						
6-11 months	4.9	4.9	4.9	4.9	------	390	100	5.9	5.0	.11	------	915	893
1	7.9	7.8	7.8	7.9	.11	889	100						
2	12.2	11.9	11.9	12.2	.29	1,044	100	12.8	11.6	.37	.29	1,092	1,034
3	12.9	12.5	12.5	12.9	.40	1,082	100						
4	20.5	20.1	20.1	20.5	.44	1,133	100	23.6	23.7	.53	.52	1,140	1,164
5	27.7	27.1	27.1	27.7	.60	1,171	100						
6	46.0	44.9	44.9	46.0	1.12	1,159	100	50.0	52.7	1.18	.70	1,183	1,145
7	58.5	57.7	57.7	58.5	.77	1,169	100						
8	58.4	57.1	56.6	57.8	1.25	1,204	99	57.6	58.2	1.39	1.76	1,076	1,135
9	60.8	58.8	55.9	57.9	1.98	1,007	95						
10	64.3	61.6	56.9	59.5	2.69	1,077	92						
11	63.3	60.9	55.5	57.9	2.44	901	91						
12	68.8	65.9	54.6	57.3	2.73	915	83	62.5	64.4	2.35	2.96	2,298	2,267
13	67.0	63.7	47.0	50.4	3.26	829	74						
14	67.6	65.5	40.4	42.5	2.14	843	62						
15	69.8	65.0	34.7	39.5	4.81	686	53						
16	68.0	65.7	32.3	34.6	2.26	708	49						
17	66.1	62.3	26.9	30.7	3.76	585	43	64.9	64.8	3.74	4.02	1,524	1,517
18	69.8	65.8	24.5	28.5	4.00	575	37						
19	70.0	65.1	27.8	32.7	4.93	487	43						
20-24	70.5	66.5	18.9	22.9	4.03	2,110	28	64.2	68.1	4.38	3.77	891	1,219
25-34	69.1	65.0	12.2	16.3	4.12	5,626	19	66.6	63.8	3.47	4.61	2,394	3,232
35-44	68.4	63.8	10.7	15.3	4.62	5,927	17	65.4	62.1	4.23	5.02	2,977	2,950
45-54	66.3	61.6	9.1	13.8	4.65	3,353	15						
55-64	65.3	61.8	7.9	11.4	3.48	1,466	13	58.8	61.7	4.80	3.66	3,083	2,730
65 and over	56.8	52.7	5.1	9.2	4.12	994	10						

[1] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

[2] A few individuals known as to case history were unknown as to vaccination history (140 out of the 37,859 persons); the rates in every instance are based on the known only. Vaccinations of unknown time (5 percent of total) were assumed to be distributed like those of known time.

Only one-fifth of the 4-year-old children had been vaccinated. Entrance into school at 5 and 6 years marks the age of many vaccinations; the proportion vaccinated rises from 20 percent at 4 years to 58 percent at 7 years of age. After 7 years the curve rises gradually to a maximum of about 65 percent for persons above 15 years who had been vaccinated and about 70 percent who had been vaccinated or had suffered an attack of smallpox.

The duration of a specific degree of immunity following vaccination varies considerably in different individuals; likewise the average duration depends to a large extent upon the standard or degree of immunity that is accepted as indicating an immune person (12). There is no general agreement as to how often revaccination should be done; the intervals recommended vary from 2 to 10 years, the traditional dictum being to revaccinate every 7 years. Immunity after an attack of smallpox is usually considered to last throughout life.

Figure 1 shows what proportion of persons of different ages gave a history of a vaccination within 7 years of the date of the interview or had suffered an attack of smallpox at any time in their lives. From a maximum of 60 percent at 10 years of age this curve declines rather rapidly to 23 percent at 20 to 24 years and to 16 percent at 25 to 34 years. After this age the decline is less rapid, the percentage being

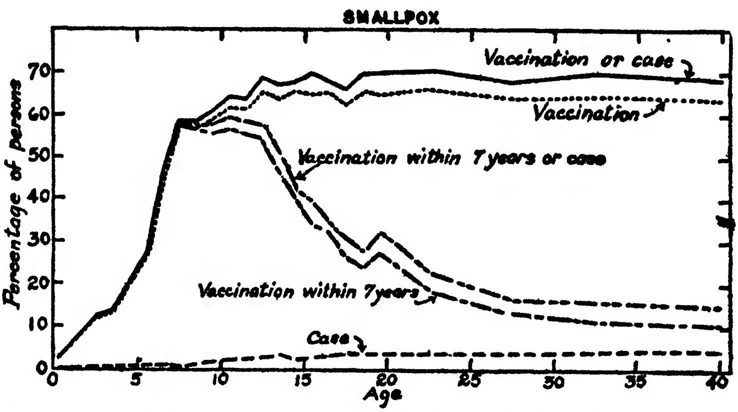

FIGURE 1.—Percentage of persons of specific ages who had been vaccinated (a) at any time, (b) within 7 years, and (c) percentage who had suffered an attack of smallpox—8,758 canvassed white families in 18 States, 1928–31.

14 at 45 to 54 years, but more than a third of this 14 percent is represented by histories of smallpox cases, with only 9 percent who had actually been vaccinated within 7 years. In other words, a small proportion of people, perhaps 10 percent, are revaccinated at intervals of 7 years or less; the great majority of children vaccinated at the time of entrance into school are never revaccinated.[3]

Considering all ages, 56.9 percent of the males and 57.9 percent of the females gave a history of vaccination or a case of smallpox at some time in their lives. These percentages were made up of 53.9 and 54.7 percent for males and females, respectively, who had been vaccinated but had not suffered attacks, and 3.0 and 3.2 percent of males and females, respectively, who gave a history of an attack of the disease.

[3] To change the period since vaccination from 7 years as here presented to some lesser interval, as 5 years or 2 years, would give a curve that declines more rapidly with age than the one shown in figure 1, and in the older ages it would approach even closer the percentage of persons who had been attacked by the disease.

These data are shown for specific ages in table 1 and figure 2. It appears that there are no consistent or significant differences between the sexes with respect to these items, with the possible exception of a higher history of smallpox cases for females in the two age groups from 25 to 44 years (table 1). The excess for females may be due to the fact that the women (housewives) were usually the informants and would know their own history better; but another possible factor is the added risk of an attack, because women of these ages usually nurse others in the household who contract smallpox.

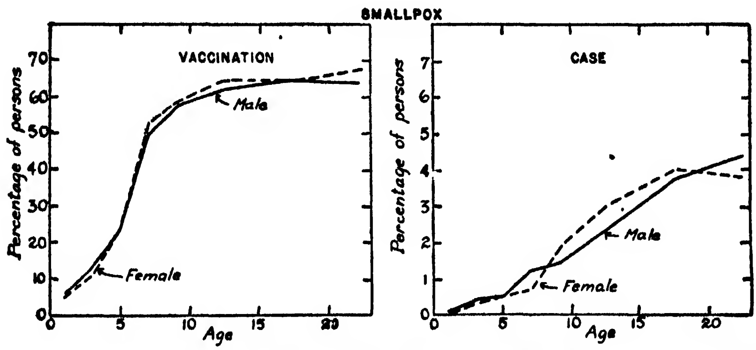

FIGURE 2.—Percentage of males and females of specific ages (a) who had been vaccinated and (b) who had suffered an attack of smallpox—8,758 canvassed white families in 18 States, 1928–31.

VARIATION OF VACCINAL STATUS WITH SIZE OF CITY AND GEOGRAPHICAL LOCATION

The proportion of persons who had been vaccinated might be expected to vary greatly from one community to another, depending upon State laws and local regulations and practices regarding vaccination.

Cities and rural areas.—In figure 3 the proportions vaccinated at different ages have been plotted for cities of various sizes and for rural areas (table 2). The rise of the curve to a maximum level by 15 to 20 years of age is characteristic of each size of city, but the sharpest increases come earlier in large cities than in rural places. Also, there is considerable difference in the height of the level which represents the proportion of adults who had been vaccinated against smallpox at some time in their lives. In the rural areas included in the survey, slightly more than 40 percent of the adults gave a history of a vaccination; in the cities with populations of 100,000 or more, about 85 percent of the adults had been vaccinated—more than twice the percentage in rural areas. The smaller cities and the towns fall logically between these two extremes, the curve for small cities reaching a maximum of 64 percent and that for towns under 5,000 a maximum of 58 percent.

TABLE 2.—*History of smallpox vaccinations among persons in cities of various sizes and in rural areas—canvassed white families in 18 States* [1]

Age in years	Percentage of persons with a history of— Vaccination or case at any time: Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Vaccination at any time but no case: Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Total number of persons considered: Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
All ages	73.0	54.0	49.3	38.5	71.5	50.5	45.0	34.2	14,089	9,531	7,442	6,797
Under 2	8.1	3.7	6.0	1.9	8.1	3.5	6.0	1.9	677	537	281	263
2–3	19.3	9.6	10.5	5.8	18.9	9.1	10.3	5.8	747	584	448	347
4–5	37.1	22.9	15.5	12.7	36.7	22.4	15.3	11.5	758	639	508	404
6–7	75.4	49.3	37.2	26.6	74.6	48.6	35.9	25.5	838	586	523	381
8–9	81.7	58.7	45.3	34.4	80.9	56.7	42.7	33.0	772	589	434	426
10–14	85.0	66.5	54.7	45.7	84.0	64.0	50.5	41.6	1,577	1,105	907	976
15–19	86.1	67.5	63.3	48.2	84.9	64.2	56.4	42.0	1,035	757	568	681
20–24	87.2	65.4	63.1	46.3	85.6	60.2	57.3	40.0	863	504	360	383
25–34	82.7	62.5	62.7	47.9	80.5	55.9	57.8	43.6	2,362	1,428	1,094	742
35–44	82.2	67.1	61.8	45.5	79.9	61.5	54.8	39.5	2,305	1,509	1,184	979
45–54	83.4	63.8	57.5	45.7	80.9	59.4	50.5	38.9	1,248	803	629	673
55 and over	74.9	60.5	60.2	42.9	72.9	56.8	56.0	36.6	907	490	521	542

[1] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

The lower section of figure 3 shows for the same size of population groups the proportion of persons of different ages who gave a history of an attack of smallpox (table 3). The order of the curves is here approximately reversed; the relatively well vaccinated cities of 100,000 or over had the smallest proportion of persons with smallpox histories, 1.5 percent for all ages, with a maximum of 2.5 percent for persons 45 to 54 years of age. The curve for smaller cities (5,000–100,000) is below those for towns and for rural areas from about 10 to 25 years, but is at approximately the same level for other ages.

TABLE 3.—*History of smallpox cases among persons in cities of various sizes and in rural areas—Canvassed white families in 18 States* [1]

Age in years	Percentage of persons with history of a case at any time: Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Number of persons with history of a case at any time: Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Total number of persons considered: Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
All ages	1.51	3.49	4.26	4.30	213	333	317	292	14,099	9,531	7,442	6,797
Under 5	.22	.35	.10	.37	4	5	1	3	1,799	1,420	1,033	818
5–9	.75	1.19	1.59	1.19	15	18	19	12	1,993	1,515	1,196	1,006
10–14	.95	2.53	4.19	4.10	15	28	38	40	1,577	1,105	907	976
15–19	1.16	3.30	6.87	6.17	12	25	39	42	1,035	757	568	681
20–24	1.62	5.16	5.83	6.27	14	26	21	24	863	504	360	383
25–34	2.20	6.58	4.94	4.31	52	94	54	32	2,362	1,428	1,094	742
35–44	2.26	5.57	6.97	6.03	52	84	79	59	2,305	1,509	1,134	979
45–54	2.48	4.36	7.00	6.84	31	35	44	46	1,248	803	629	673
55 and over	1.98	3.67	4.22	6.27	18	16	22	34	907	490	521	542

[1] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

Considering all ages, 3.5 percent of people living in the smaller cities gave a history of a case of smallpox, as against 4.3 percent for both the towns under 5,000 and the rural areas. Throughout the various ages the curves for towns under 5,000 and for rural unincorporated areas are quite close together, suggesting that fewer vaccinations in the rural population may be compensated for by less contact among these families. Another possible factor is a greater frequency of cowpox in the farm population, with resulting immunity to smallpox. Unrecognized smallpox cases would similarly result in immunity without a reported history of an attack or vaccination. Many of the towns under 5,000 are agricultural villages in the center of rural areas, and their disease histories might be expected to be similar.

TABLE 4.—*Comparison of the history of smallpox vaccination among preschool children in the present study in 18 States with the results of the White House conference study (17) in 156 cities in 45 States and 597 counties in 42 States*

	Percentage of children of the given ages who had been vaccinated at any time					
	Under 1	1	2	3	4	5
18 States study:						
Cities of 100,000 and over	4.8	11.3	19.3	18.5	30.4	42.8
Cities 5,000–100,000	2.7	4.6	8.4	9.7	18.5	25.9
White House conference study (17, pp 49, 174), urban (145,720 preschool children in 156 cities mostly over 50,000):						
All 156 cities combined	3.4	11.1	16.7	20.8	28.4	43.8
Median of the 156 cities	0	3	7	11	17	30
18 States study:						
Towns under 5,000	2.7	8.8	9.5	11.0	13.8	16.9
Rural areas	1.4	2.4	3.6	7.7	11.2	11.7
White House conference study (17, p. 175), rural (37,439 preschool children in towns under 2,500 and on farms)	.6	2.3	4.8	7.6	11.4	17.9

The percentages of preschool children in cities of different sizes that had been vaccinated may be compared with those found by Palmer, Derryberry, and Van Ingen (17) in the White House Conference report, covering a large number of cities and counties throughout the country. The results in the two studies (table 4) are reasonably comparable, and the indicated differences between urban and rural vaccination practices are of the same order of magnitude.

No large body of similar data is available for comparison with results for the school ages. In the absence of more recent records, comparison may be made with vaccination histories as recorded in physical examinations of school children made about 1920 by medical officers of the United States Public Health Service (table 5). The percentage of children of given ages who had been vaccinated varied a great deal from locality to locality, presumably because of differences in vaccination laws, regulations, and practices. In the 14 localities where school children were examined, the proportion of 12- and 13-year-olds who had been vaccinated varied from 25 to 98 percent, as

against 44 percent in rural areas to 86 percent in large cities included in the present family survey, with individual communities varying more than these limits indicate.

TABLE 5.—*Comparison of the history of smallpox vaccination among children of the school ages as reported in canvasses of families in 18 States (1928–31) and as determined by physical examinations of children in certain localities (1917–28)*

Locality and populations in 1920 (approximate time of school examinations)	Number of children observed, all ages, 6–15	Percentage of children of specific ages who had been vaccinated at any time						
		All ages, 6–15	6	7	8–9	10–11	12–13	14–15
Canvass of families in 18 States:								
Cities of 100,000 or over	3,645	81.1	67.1	81.5	80.9	81.7	85.6	84.3
Cities 5,000–100,000	2,636	59.8	42.6	54.5	56.7	63.5	64.9	65.6
Towns under 5,000	2,125	46.2	32.0	40.1	42.7	49.5	50.0	58.3
Rural areas	2,092	37.3	20.2	30.9	33.0	37.7	43.6	44.9
Examination of school children in certain localities:								
Cotton-mill villages near Spartanburg, S. C. (village)	969	19.7	3.9	10.8	17.0	22.5	26.2	33.3
New Castle County, Del. (rural and village)	631	31.2	17.6	28.3	24.6	23.3	35.9	43.7
Spartanburg, S. C. (22,638)	1,443	52.2	28.6	39.0	51.4	57.7	56.5	56.7
Fort Worth, Tex. (106,482)	3,570	55.1	31.2	44.7	54.9	57.3	58.9	54.1
Nassau County, N. Y. (rural and village)	703	64.3	31.6	45.8	58.5	70.1	78.1	76.8
Leavenworth, Kans. (16,912)	1,767	72.3	67.7	67.8	71.5	73.2	75.1	74.6
Louisville, Ky. (234,891)	2,794	79.9	58.6	64.1	74.2	83.0	86.1	89.2
Frederick County, Md. (rural and towns up to 11,066)	3,964	86.1	70.0	80.4	85.0	87.6	88.4	91.3
Hampton, Va. (6,138)	1,072	87.8	80.0	87.0	87.2	88.2	89.8	86.7
Hattiesburg, Miss (13,270)	593	91.2	86.4	90.6	93.7	88.7	92.8	92.0
Charlotte, N. C. (46,338)	3,951	91.6	84.0	92.4	92.2	91.4	92.8	91.4
Petersburg, Va. (31,012)	1,682	93.9	96.8	82.6	93.4	95.9	95.5	[illegible]
Greenville, S. C. (23,127)	711	94.0	98.5	95.9	94.5	93.2	93.2	90.9
Waco, Tex. (38,500)	3,632	95.6	91.3	96.2	95.3	94.8	97.5	94.5

Geographic location.—The 18 States in which the surveyed population lived may be divided into 4 geographic sections, the *Northeast* (New York, Massachusetts, Connecticut), representing the New England and Middle Atlantic States, the *North Central* (Illinois, Ohio, Michigan, Indiana, Wisconsin, Minnesota, Kansas), representing the North Central States, the *South* (District of Columbia, Virginia, West Virginia, Tennessee, Georgia), representing the South Atlantic and South Central States, and the *West* (Colorado, California, Washington), representing the Mountain and Pacific States.[4]

In figure 4 the vaccination history has been plotted for each of the 4 geographic sections (table 6). Curves of the kind under consideration in this paper are cumulative in nature, because they give the percentage that had ever been vaccinated. In the absence of change in the annual frequency of vaccinations, one would expect, apart from chance fluctuations, a continuously rising curve. The hump at 8 to 9 years in the curve for the South suggests that in this section more vaccinations have been made in recent years than 10 or 15 years ago.

[4] Further details about the number of families from each State and each class of city are included in a previous paper (1).

Table 6.—*History of smallpox vaccinations among persons in 4 geographic sections [1] of the United States, canvassed white families in 18 States [2]*

Age in years	Percentage of persons with a history of— Vaccination or case at any time				Vaccination at any time but no case				Total number of persons considered			
	North-east	North Central	South	West	North-east	North Central	South	West	North-east	North Central	South	West
All ages	48.5	59.7	56.9	64.4	47.6	56.1	53.8	59.9	8,877	14,200	7,600	7,182
Under 2	9.8	2.9	2.6	10.2	9.5	2.9	2.6	10.2	388	699	418	303
2–3	22.0	7.3	5.6	21.3	22.0	6.9	5.4	20.4	482	852	445	347
4–5	27.3	19.7	20.0	36.0	27.3	19.0	19.6	34.9	547	908	482	367
6–7	41.4	51.6	60.5	57.7	41.2	50.3	59.7	56.4	513	929	505	381
8–9	45.3	58.1	76.8	60.6	44.9	56.1	75.9	57.5	499	869	452	391
10–14	47.7	71.3	75.1	67.8	47.2	67.9	72.4	63.8	1,051	1,731	1,001	782
15–19	52.1	76.9	72.9	69.8	51.0	71.7	69.4	64.5	715	1,036	663	627
20–24	55.3	78.9	68.6	74.5	54.5	73.9	63.7	69.6	474	758	448	430
25–34	58.0	72.3	66.9	77.1	56.3	67.9	62.5	71.0	1,214	2,303	1,077	1,032
35–44	60.9	71.8	63.6	75.1	59.9	66.5	58.7	67.8	1,359	2,267	1,126	1,175
45–54	55.2	73.2	62.2	72.0	54.3	66.7	57.2	65.9	893	1,118	566	776
55 and over	55.9	66.9	50.7	71.3	53.3	62.4	46.1	67.6	742	730	417	571

[1] A preceding paper (1) gives the number of families canvassed in each State classified according to the size of the city of residence. States included in the survey were—*Northeast:* New York, Massachusetts, Connecticut. *North Central:* Illinois, Ohio, Michigan, Indiana, Wisconsin, Minnesota, Kansas. *South:* District of Columbia, Virginia, West Virginia, Tennessee, Georgia. *West:* Washington, California, Colorado.

[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

Comparing this chart with figure 3, which shows similar data for cities of different sizes, less variation appears in the vaccinal status of different geographic sections than in that of cities of different sizes. The Northeast appears to be less well vaccinated than the other sections. However, in some geographic sections many cities are included in the surveyed sample, and in others the sample is more largely rural in composition. One cannot judge accurately the vaccinal status of an area without considering both size of city and section of the country.

The lower part of figure 4 shows for the different geographic sections the percentage of persons with a history of an attack of smallpox (table 7). In spite of an apparently low vaccinal status in the Northeast, it has the lowest smallpox history of any section; the cities of this region, however, are well vaccinated and probably have afforded protection to the rural areas. The West shows the highest proportion of persons with a history of smallpox, 4.5 percent for individuals of all ages; but the North Central and the South are not far behind, with 3.6 and 3.1 percent, respectively, as against 0.9 percent for the Northeast.

In the comparison of vaccination histories in this study with those of the White House Conference report for preschool children (17, p. 64), attention must be centered upon the early ages as they are different from the later ones. In the preschool years the Northeast and the West have higher vaccination history rates than the South,

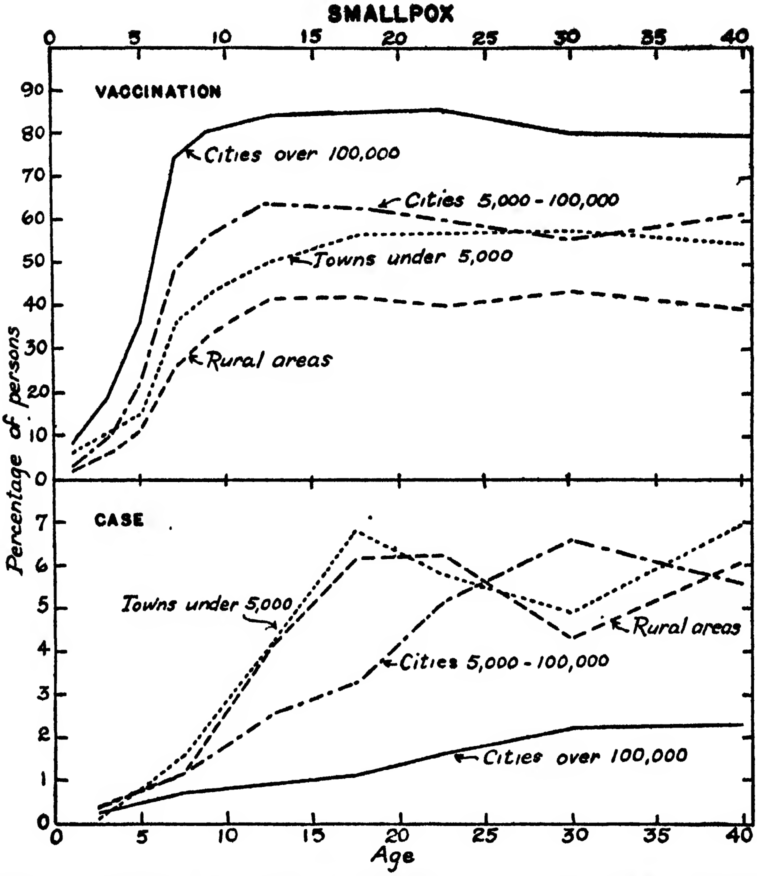

FIGURE 3.—Percentage of persons of specific ages in cities and rural areas (a) who had been vaccinated and (b) who had suffered an attack of smallpox—8,758 canvassed white families in 18 States, 1928–31

TABLE 7.—*History of smallpox cases among persons in 4 geographic sections [1] of the United States—canvassed white families in 18 States* [2]

Age in years	Percentage of persons with history of a case at any time				Number of persons with history of a case at any time				Total number of persons considered			
	North-east	North Central	South	West	North-east	North Central	South	West	North-east	North Central	South	West
All ages	.91	3.63	3.05	4.54	81	516	232	326	8,877	14,200	7,600	7,182
Under 5	.09	.25	.27	.49	1	5	3	4	1,148	1,984	1,113	822
5–9	.23	1.45	.67	2.07	3	33	8	20	1,281	2,273	1,189	967
10–14	.48	3.35	2.70	3.96	5	58	27	31	1,051	1,731	1,001	782
15–19	1.12	5.21	3.47	5.26	8	54	23	33	715	1,036	663	627
20–24	.84	5.01	4.91	4.88	4	38	22	21	474	758	448	430
25–34	1.65	4.43	4.36	6.10	20	102	47	63	1,214	2,303	1,077	1,032
35–44	.96	5.29	4.88	7.32	13	120	55	86	1,359	2,267	1,126	1,175
45–54	.90	6.53	4.95	6.06	8	73	28	47	893	1,118	566	776
55 and over	2.56	4.52	4.56	3.68	19	33	19	21	742	780	417	571

[1] For definition of sections, see note 1 to table 6.
[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

in agreement with the White House Conference report; but in that study the North Central ranks as high as the West, and the Northeast stands above all other sections in vaccinations. When the data in the present study are limited to cities (table 8), as in the data referred to in the White House Conference report, the Northeast stands far above the other areas, the West second, and the North Central and South at the bottom, with about the same rates.

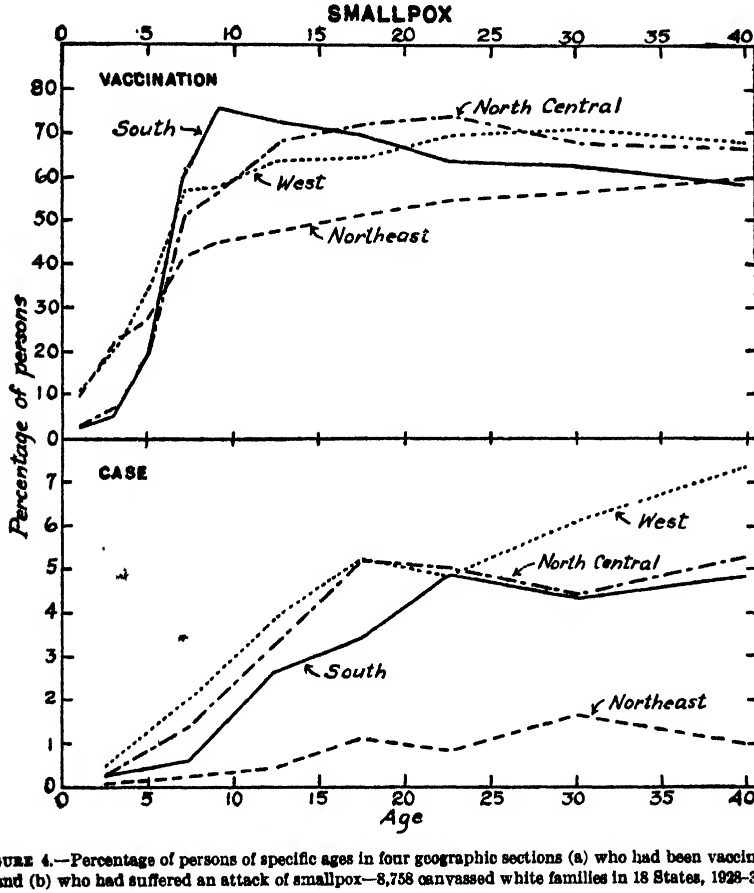

FIGURE 4.—Percentage of persons of specific ages in four geographic sections (a) who had been vaccinated and (b) who had suffered an attack of smallpox—8,758 canvassed white families in 18 States, 1928–31

Cities and rural areas in each geographic section.—Figure 5 shows the proportion of individuals who had been vaccinated in cities of different sizes in each of the four geographic regions (table 8). In each section, persons living in cities with populations of 100,000 or more are relatively well vaccinated; the proportion of adults in these places who had been vaccinated varies roughly from 80 to 90 percent. In the Northeast section, which appeared particularly low in figure 4, where all sizes of cities were considered together, 88 percent of chil-

dren 5 to 9 years of age living in large cities had been vaccinated. In the smaller cities and the rural parts of the Northeast, the proportion

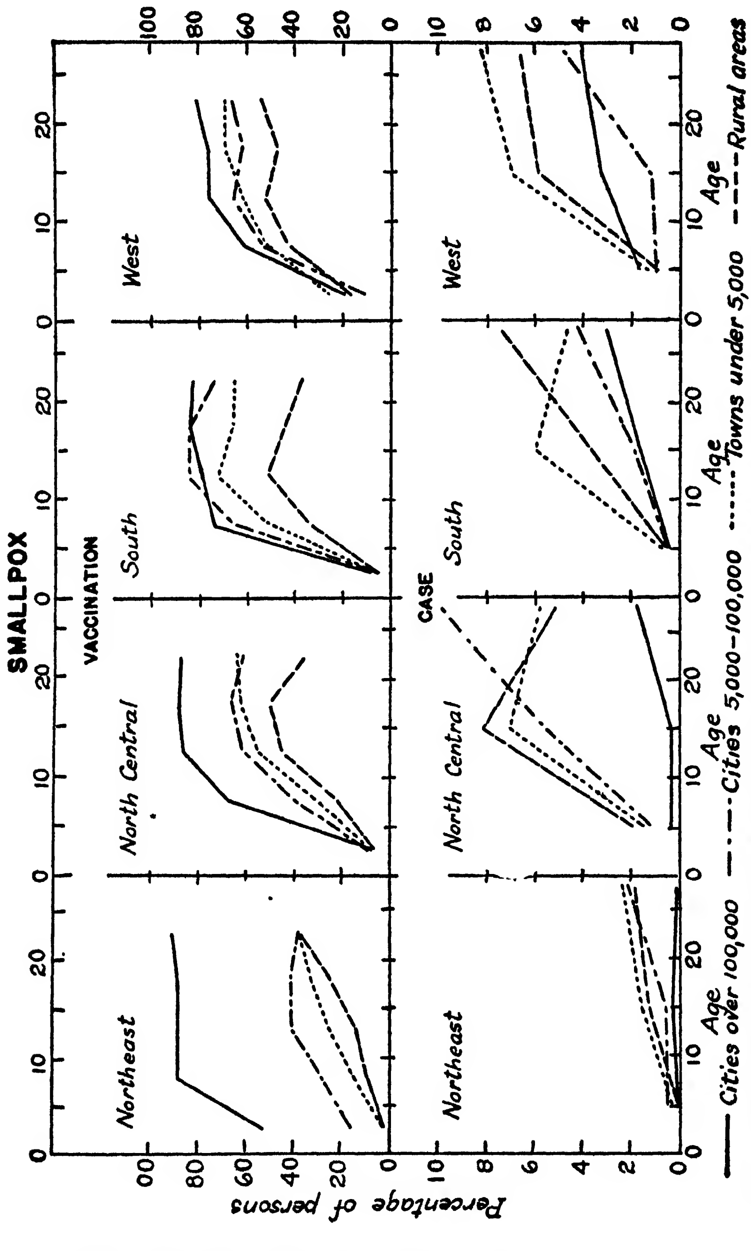

FIGURE 5.—Percentage of persons of specific ages in metropolitan, urban, and rural parts of four geographic sections (a) who had been vaccinated and (b) who had suffered an attack of smallpox—3,758 canvassed white families in 18 States, 1928–31.

of persons vaccinated was much lower; only 9 percent of the rural children 5 to 9 years and 13 percent of those 10 to 14 years of age had

been vaccinated. In the other three sections also the rural areas stand at the bottom, and in general the towns and the smaller cities fall between the large cities and the rural areas in the proportion of persons with a history of vaccination.

TABLE 8.—*History of smallpox vaccinations among persons in metropolitan, urban, and rural parts of 4 geographic sections [1] of the United States—canvassed white families in 18 States* [2]

Age in years	Percentage of persons with a history of—								Total number of persons considered [2]			
	Vaccination or case at any time				Vaccination at any time but no case							
	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
	Northeast [1]											
All ages	82.2	37.2	32.4	27.0	81.9	36.1	31.1	25.8	2,872	1,831	2,411	1,763
Under 5	51.6	16.1	1.9	1.8	51.6	15.7	1.9	1.8	312	255	363	218
5–9	87.7	27.4	14.9	9.2	87.7	27.0	14.3	9.2	424	260	343	254
10–14	88.3	40.4	24.6	13.6	88.0	40.0	23.8	13.1	359	229	264	199
15–19	87.8	41.8	34.7	24.8	87.8	41.2	32.0	22.8	238	177	150	150
20–24	89.7	38.7	38.8	38.1	89.7	37.8	36.9	37.1	155	111	103	105
25–34	87.0	33.0	49.9	46.6	87.0	30.3	47.5	44.4	386	225	379	224
35–44	82.6	45.9	46.7	45.0	82.2	44.1	45.8	43.2	551	233	350	225
45 and over	83.4	52.4	46.9	35.9	82.1	50.9	44.9	34.1	447	341	459	388
	North Central [1]											
All ages	71.0	53.8	52.7	40.2	69.8	48.2	47.0	34.2	6,540	3,795	1,863	2,002
Under 5	7.4	8.7	7.5	6.4	7.4	8.4	7.1	5.6	893	602	239	250
5–9	66.7	41.2	31.6	24.7	66.1	39.4	29.7	22.1	947	657	361	308
10–14	86.6	65.5	61.8	51.8	86.3	61.1	55.4	45.4	724	429	267	311
15–19	88.8	73.2	69.7	60.8	88.3	65.7	61.5	50.3	436	254	146	200
20–24	88.8	71.8	69.2	45.7	87.0	60.8	63.0	35.8	448	164	65	81
25–34	82.2	64.3	67.2	45.2	80.5	54.6	61.5	41.9	1,210	621	262	210
35–44	82.7	69.7	68.1	46.7	80.5	62.2	60.9	38.2	971	656	321	319
45 and over	80.6	67.7	71.3	46.6	78.5	59.7	57.9	38.2	911	412	202	323
	South [1]											
All ages	67.6	61.4	56.5	36.7	65.8	58.8	52.2	32.3	1,910	2,908	1,152	1,680
Under 5	8.5	6.4	4.8	4.7	8.5	6.0	4.8	4.2	270	485	146	212
5–9	73.9	66.0	52.0	34.8	73.2	65.4	50.8	34.4	306	482	174	237
10–14	81.3	85.6	77.8	53.4	78.9	83.8	72.3	51.0	252	333	163	253
15–19	83.4	85.5	72.5	50.3	82.7	83.6	65.8	44.9	151	207	120	185
20–24	82.1	77.2	71.1	45.4	82.1	73.0	64.7	37.0	84	167	78	119
25–34	76.3	71.4	61.7	40.1	72.3	67.2	58.1	33.7	302	477	141	157
35–44	76.2	71.4	60.4	31.1	73.0	66.1	53.1	26.4	315	434	165	212
45 and over	74.6	60.6	59.9	37.0	72.9	57.2	54.4	28.3	230	323	165	265
	West [1]											
All ages	72.1	63.4	62.5	52.4	68.8	60.9	56.0	46.7	2,767	997	2,016	1,402
Under 5	19.8	10.3	24.6	15.6	18.6	10.3	24.6	15.6	324	78	265	185
5–9	62.9	56.2	54.7	43.3	60.7	53.5	52.2	41.9	316	116	318	217
10–14	78.9	66.7	65.7	57.7	76.4	64.9	61.0	51.6	242	114	213	213
15–19	80.4	62.2	78.1	52.1	76.1	61.4	68.2	46.6	210	119	152	146
20–24	83.4	64.5	76.3	59.7	80.0	64.5	67.5	53.3	176	62	114	78
25–34	84.2	74.3	74.9	61.6	79.9	66.7	66.9	55.0	464	105	312	151
35–44	84.5	73.7	72.7	58.1	80.4	69.4	69.9	50.0	468	186	298	223
45 and over	77.9	71.3	67.1	68.7	74.4	69.5	60.6	54.1	567	217	324	290

[1] For definition of sections, see note 1 to table 6.
[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

TABLE 9.—*History of smallpox cases among persons in metropolitan, urban, and rural parts of 4 geographic sections* [1] *of the United States—canvassed white families in 18 States* [2]

Age in years	Percentage of persons with history of a case at any time				Number of persons with history of a case at any time				Total number of persons considered			
	Cities of 100,000 or over	Cities 5,000-100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000-100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000-100,000	Towns under 5,000	Rural areas
	Northeast [1]											
All ages	0.3	1.1	1.3	1.2	9	20	31	21	2,872	1,831	2,411	1,763
Under 10	------	.4	.3	------	------	2	2	------	736	515	706	472
10-19	.2	.5	1.4	1.1	1	2	6	4	597	406	414	349
20-34	------	2.1	2.3	1.8	------	7	11	6	541	336	482	329
35-44	.4	1.7	.9	1.8	2	4	3	4	551	233	350	225
45 and over	1.3	1.5	2.0	1.8	6	5	9	7	447	341	459	388
	North Central [1]											
All ages	1.2	5.6	5.7	6.0	78	212	106	120	6,540	3,795	1,863	2,002
Under 10	.3	1.1	1.3	1.8	6	14	8	10	1,840	1,259	600	558
10-19	.3	5.6	7.0	8.0	4	38	29	41	1,160	683	413	511
20-34	1.7	9.9	5.8	5.1	28	78	19	15	1,658	785	327	291
35-44	2.2	7.5	7.2	8.5	21	49	23	27	971	656	321	319
45 and over	2.1	8.0	13.4	8.4	19	33	27	27	911	412	202	323
	South [1]											
All ages	1.8	2.6	4.3	4.4	35	76	50	71	1,910	2,908	1,152	1,630
Under 10	.3	.5	.6	.5	2	5	2	2	576	967	320	439
10-19	1.7	1.8	6.0	3.6	7	10	17	16	403	540	283	438
20-34	3.1	4.2	4.6	7.2	12	27	10	20	386	644	219	276
35-44	3.2	5.3	7.3	4.7	10	23	12	10	315	434	165	212
45 and over	1.7	3.4	5.4	8.7	4	11	9	23	230	323	165	265
	West [1]											
All ages	3.3	2.5	6.4	5.7	91	25	130	80	2,767	997	2,016	1,402
Under 10	1.7	1.0	1.3	.8	11	2	8	3	640	194	603	352
10-19	3.3	1.3	6.8	5.8	15	3	25	21	452	233	365	359
20-34	4.1	4.8	8.2	6.5	26	8	35	15	640	167	426	229
35-44	4.1	4.3	13.8	8.1	19	8	41	18	468	186	298	223
45 and over	3.5	1.8	6.5	9.6	20	4	21	23	567	217	324	239

[1] For definition of sections, see footnote 1 to table 6.
[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

The lower part of figure 5 shows the history of smallpox cases in cities of different sizes in each geographic section (table 9). Considering first the Northeast, what appeared as an inconsistency now appears to show what might be expected, viz, the relatively well-vaccinated cities of 100,000 or over in this area have the lowest smallpox case history of any unit shown in the graph, amounting to only 0.3 percent for persons of all ages. The small cities, towns, and rural areas, which have fewer vaccinations, all have higher smallpox

history rates than the large cities in this section, but less than similar communities in other geographic regions. In every section the towns under 5,000 and the rural areas have higher smallpox history rates than the two classes of better vaccinated cities; the West is an exception in that towns under 5,000 in the surveyed group are as well vaccinated as cities 5,000 to 100,000, but the towns show considerably higher smallpox history rates than the cities. In spite of a generally better vaccinal status in towns under 5,000 than in rural areas, they show, in three of the four geographic regions, slightly higher smallpox case history rates than the rural areas, a result perhaps due to less contact between families on the farms.

It is probable that relatively well-vaccinated cities afford considerable protection to less vaccinated rural areas because smallpox epidemics frequently start in cities and spread to the country districts (16).

III. VACCINATIONS AND CASES DURING THE 12-MONTH STUDY

The record of all medical care, whether for illness or preventive service, affords accurate data on the frequency of vaccinations during the 12 months of the morbidity study.

The histories of prior vaccinations refer to the whole life of the individual and the resulting percentages tend to average out the periods of high and low vaccination rates. The record for the 1 year, although more accurate than the history data, may represent more frequent or less frequent vaccinations than the average over a period of years. As a test of the representativeness of the study year, the current rates may be cumulated [5] to approximate a curve of vaccination histories that would result from the repetition year after year of the current vaccination rates. Conversely, an approximation of the annual vaccination rates per 100 for given years of age may be obtained from the cumulative curve by computing differences between the percentages vaccinated for successive ages. Considering both phases of this test, the cumulative history curve indicates that about 23.6 [6] percent of children have been vaccinated by the time they reach their fifth birthday and the cumulation of the current rates up to 5 years of age gives 20.7 percent. To put it in another way, the cumulative figure of 23.6 percent by 5 years of age indicates an average annual rate under 5 years of 47.2 per 1,000, as against the observed rate of 42.1. Proceeding to 10 years, the history curve indicates that 60.2 percent were vaccinated by the tenth

[5] The method is valid only if all of the current vaccinations are first vaccinations, an assumption that seems approximately true up to 10 years of age

[6] The figure 23.6 percent representing those who have been vaccinated by 5.0 years of age is a straight line interpolation between 20.1 at 4 years and 27.1 at 5 years of age at last birthday, which represent children of an average age of 4.5 and 5.5 years, respectively. Similar interpolations were made to determine figures for 10.0 and 15.0 years of age.

birthday, and the cumulated current rates give 55.8 percent. If one deducts from the 60.2 percent who have been vaccinated by the tenth birthday the 23.6 percent vaccinated before the fifth birthday, there are 36.6 percent vaccinated between the fifth and tenth birthdays, or an average annual rate of 73.2 per 1,000, as compared with an observed current rate at these ages of 70.3. Carrying the same computations to the fifteenth birthday, the history curve indicates that 65.3 percent had been vaccinated, and the cumulation of the current rates is 77.6 percent. The rate of vaccinations for 10 to 14 years as estimated from the histories amounts to only 10.2 per 1,000, as compared with an observed current rate of 43.6 per 1,000.

Up to the tenth year of age the current vaccination rates seem reasonably representative of average vaccination rates in preceding years in the same localities. Above 10 years, the disagreement may be due to one or more of the following reasons: (*a*) More vaccinations than usual in the current year, (*b*) incomplete reporting of vaccination histories, (*c*) more current immunizations being second vaccinations and therefore not adding to the percentage of persons with a history of prior vaccination.[7]

AGE, SEX, AND MARITAL STATUS

Figure 6 shows vaccinations during the study year per 1,000 persons in specific age and sex groups (table 10). The data for both sexes are shown in single years to 8 and in 2-year groups to 20 years. The current vaccination rate rises rapidly as age increases to a peak of 99 per 1,000 at 5 years; this maximum at the time of or just before school entrance no doubt reflects school regulations on vaccination. The frequency of vaccinations drops as age increases until at 18 to 19 and 20 to 24 years, the first ages after usual school life, the rates per 1,000 are 19 and 15, respectively. Aside from apparently chance fluctuations the rates continue a gradual downward trend to the end of the life span, with only 5 vaccinations per 1,000 among persons 65 years old or over.

During the school ages and up to about 25 years the vaccination rate is slightly higher for females than for males, but above those ages the reverse is true.

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[7] Another test of the representativeness of the current vaccination rates might be made. If the histories for a given age represent the proportion vaccinated at the beginning of the 12-month study, one can add to this percentage the proportion of the same age who were vaccinated during the year of the study and obtain the percentage with a history of vaccination at the end of the study year. However, the individuals are all a year older at the end of the year than at its beginning, and so each age must be increased by one year to make the data comparable with results for the beginning of the year. When this procedure is carried out the new curve of histories of vaccination at the end of the year is, up to 10 years, quite similar to the curve for the beginning of the year.

Considering persons 20 to 34 years of age the vaccination rate for married men is three times that for single; among women the rate for the married is only slightly above that for the single (table 11).

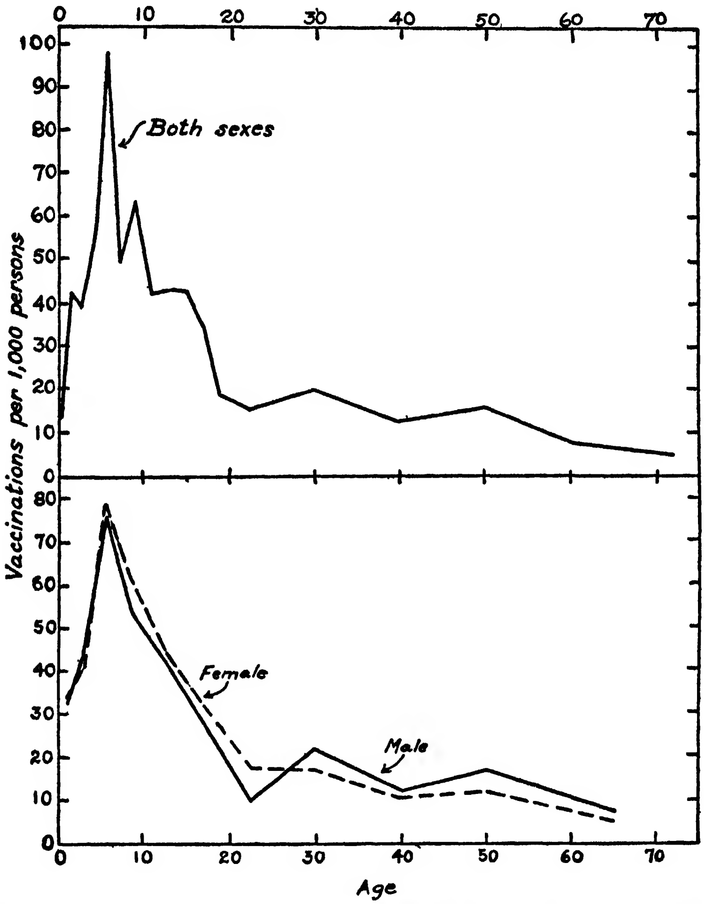

FIGURE 6.—Annual smallpox vaccinations per 1,000 persons of specific ages for each sex—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31

FAMILY INCOME

Figure 7 shows vaccination rates among persons classified according to total family income (table 12). Considering all ages, families with less than $1,200 a year and those with $5,000 and over a year had about the same vaccination rates, but both are nearly twice the rates for the three intervening income classes. Considered for persons of specific ages, the lowest and highest income groups have the highest rates at each age. Among children under 5 years, aside from the high

TABLE 10.—*Annual smallpox vaccinations per 1,000 persons of specific ages of each sex—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Age in years	Both sexes[1]: Vaccinations per 1,000 population per year	Both sexes[1]: Number of vaccinations	Both sexes[1]: Population (years of life)	Vaccinations per 1,000 population per year: Male	Vaccinations per 1,000 population per year: Female	Number of vaccinations: Male	Number of vaccinations: Female	Population (years of life): Male	Population (years of life): Female
All ages[1]	31.4	[1] 1,209	[1] 38,544	31.3	31.5	[1] 591	[1] 618	[1] 18,896	[1] 19,637
Under 20	49.0	923	18,846	47.3	50.8	447	476	9,456	9,389
Under 6 months	13.3	6	450						
6–11 months	27.8	15	540	32.7	34.6	37	38	1,133	1,097
1	42.8	54	1,261						
2	39.3	41	1,044	43.9	42.0	48	43	1,093	1,023
3	46.6	50	1,072						
4	57.6	66	1,146						
5	99.0	116	1,172	76.1	78.7	130	139	1,709	1,767
6	75.1	87	1,158						
7	49.5	58	1,171	54.9	62.6	93	106	1,693	1,692
8–9	63.7	141	2,214						
10–11	42.4	84	1,980						
12–13	43.0	75	1,744	[2] 42.6	44.6	98	101	2,301	2,267
14–15	42.5	65	1,530						
16–17	34.7	45	1,296	[3] 26.8	32.2	41	49	1,527	1,523
18–19	18.7	20	1,068						
20–24	15.1	32	2,119	10.1	18.8	9	23	894	1,225
25–34	19.9	112	5,640	22.5	17.9	54	58	2,402	3,238
35–44	12.1	72	5,930	12.8	11.5	38	34	2,979	2,951
45–54	15.5	52	3,351	17.9	12.6	33	19	1,845	1,506
55–64	7.5	11	1,478	7.3	5.7	9	7	1,241	1,230
65 and over	5.0	5	998						

[1] "All ages" includes a few of unknown age; "both sexes" includes a few of unknown sex.
[2] 10–14 years.
[3] 15–19 years.

TABLE 11.—*Annual smallpox vaccinations per 1,000 single and married persons 20–34 years of age—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Marital status	Vaccinations per 1,000 population per year			Number of vaccinations			Population (years of life)		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Single	12.1	7.6	16.9	22	7	15	1,812	922	890
Married	20.8	23.7	18.8	122	56	66	5,869	2,364	3,505

rate in the lowest income class, the rates increase rapidly with income.[8] At the early school ages, 5 to 9 years, the poor and well-to-do have higher vaccination rates, but the three intervening groups all show rates of about the same magnitude. In the later school ages, 10 to 14 and 15 to 19, vaccinations tend to decrease as income increases between the range of $1,200 and $5,000, probably due in part to the fact that more children in the higher income classes were vaccinated in the preschool ages; it has already been seen that few revaccinations occur.

[8] This result is in general agreement with the findings in the study of preschool children by Palmer, Derryberry and Van Ingen (17, p. 51) except that the lowest economic group in their study does not show more frequent vaccinations than the middle groups.

TABLE 12.—*Annual smallpox vaccinations per 1,000 persons of specific ages in different income levels—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Annual family income	All ages [1]	Under 5	5–9	10–14	15–19	20–44	45 and over
	Vaccinations per 1,000 population per year						
Under $1,200	48.8	46.8	96.2	69.0	40.9	36.4	13.4
$1,200 but under $2,000	26.3	24.4	60.6	40.9	26.4	13.1	6.3
$2,000 but under $3,000	24.8	35.0	64.6	30.4	28.8	8.5	8.5
$3,000 but under $5,000	24.2	60.2	56.1	25.1	15.9	12.7	8.2
$5,000 and over	44.6	133.2	97.6	59.5	39.2	20.4	24.3
	Number of vaccinations						
Under $1,200	284	45	90	54	19	64	12
$1,200 but under $2,000	353	54	132	66	26	63	10
$2,000 but under $3,000	235	48	91	34	21	30	11
$3,000 but under $5,000	119	32	36	13	7	24	7
$5,000 and over	209	51	49	30	17	34	28
	Population under observation [2]						
Under $1,200	5,820	962	936	783	464	1,758	896
$1,200 but under $2,000	13,419	2,216	2,178	1,612	983	4,792	1,596
$2,000 but under $3,000	9,491	1,370	1,409	1,118	728	3,537	1,299
$3,000 but under $5,000	4,911	532	642	517	441	1,893	855
$5,000 and over	4,689	383	502	504	434	1,670	1,154

[1] "All ages" includes a few of unknown age.
[2] Nearly all persons were under observation during the entire 12 months. For births during the study an adjustment was made to reduce their observation period to full-time years of life

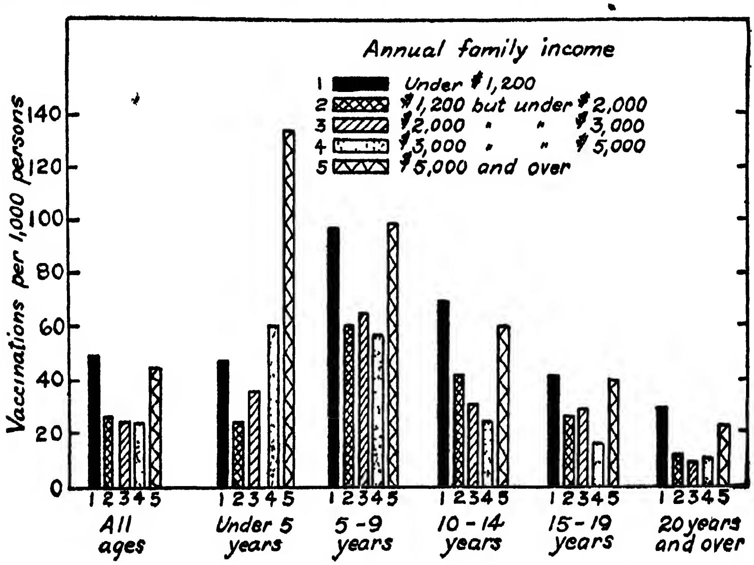

FIGURE 7.—Annual smallpox vaccinations per 1,000 persons of specific ages in 8,758 canvassed white families of different income levels in 18 States during 12 consecutive months, 1928–31.

OCCUPATION

Vaccinations were more frequent during the study year among clerical and professional men than among the artisan and laboring groups. Farmers had lower vaccination rates than any of these classes (fig. 8 and table 13).

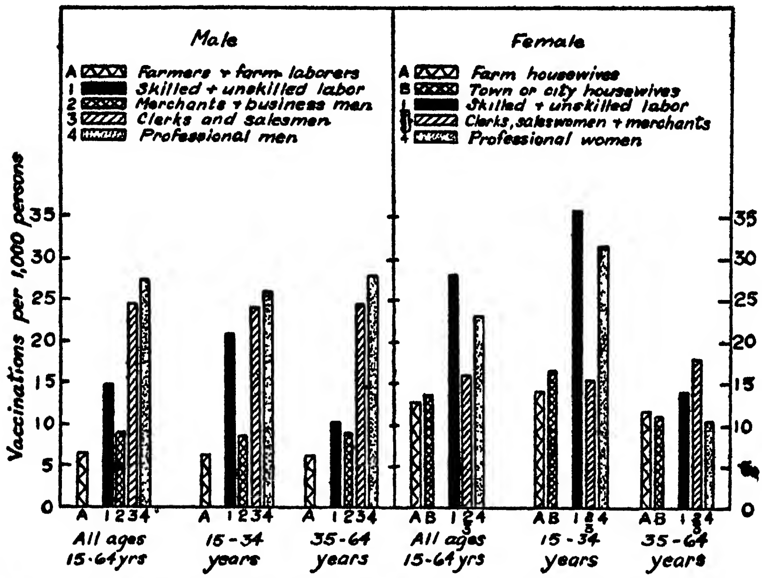

FIGURE 8.—Annual smallpox vaccinations per 1,000 persons in certain occupations—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31.

TABLE 13.—*Annual smallpox vaccinations per 1,000 persons in certain occupations—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Occupation	Vaccinations per 1,000 population per year			Number of vaccinations			Population under observation		
	All ages 15–64	15–34	35–64	All ages 15–64	15–34	35–64	All ages 15–64	15–34	35–64
	Male								
Professional	27.2	25.9	27.7	18	5	13	662	193	469
Merchants and business	24.3	24.1	24.4	32	8	24	1,316	332	984
Clerks and salesmen	8.9	8.7	9.0	13	6	7	1,464	690	774
Skilled and unskilled laborers	14.8	20.8	10.2	59	36	23	3,984	1,732	2,252
Farmers and farm laborers	6.3	6.4	6.2	6	2	4	958	311	647
	Female								
Professional	23.0	31.5	10.4	11	9	2	478	286	192
Clerks, saleswomen, and merchants	15.9	15.3	18.0	12	9	3	755	588	167
Skilled and unskilled laborers	27.8	35.7	13.9	11	9	2	396	252	144
All housewives [1]	13.4	16.3	11.2	106	56	50	7,897	3,444	4,453
Town or city housewives	13.6	16.6	11.1	89	49	40	6,548	2,947	3,601
Farm housewives	12.6	14.1	11.7	17	7	10	1,349	497	852

[1] "Housewife" here means a person in charge of the home, and therefore includes a few single women.

VACCINATIONS IN DIFFERENT LOCALITIES

It has been seen that, as measured by vaccination histories, cities are considerably better vaccinated than the small towns and rural areas. This does not necessarily imply that vaccinations during any 1 year would be more frequent in large cities; in fact, if vaccination is consistently enforced, the number vaccinated each year might be fairly small.[9]

Vaccinations during the 12-month period of this study were largely concentrated in a few communities. In table 14 the localities have been classified into those with large numbers of vaccinations in the surveyed families, those with few or scattered vaccinations only, and those with no vaccinations during the year. The table omits the few communities that were represented by less than 10 families; the great majority of the places included 30 or more households, the average being 73 families per community.

TABLE 14.—*Percentage of localities, of families, and of smallpox vaccinations in places with large numbers of vaccinations, with few vaccinations, and with no vaccinations in the surveyed group—canvassed white families in 119 localities with 10 or more families under observation during 12 consecutive months, 1928–31*

Vaccinations in the surveyed families during the year of the study	Percentage of—			Number of—		
	Localities	Families	Vaccinations	Localities	Families	Vaccinations
All localities	100.0	100.0	100.0	119	8,713	1,205
Localities with large numbers of vaccinations (20 or more per 100 families) in the face of a smallpox epidemic or threatened epidemic	10.1	9.3	74.2	12	807	894
Localities with few vaccinations	46.2	61.1	25.8	55	5,328	311
Localities with no vaccinations	43.7	29.6		52	2,578	

Twelve communities, or 10 percent of the 119 localities, including 9 percent of the surveyed families, contributed 74 percent of the vaccinations during the year. The other 26 percent of the vaccinations were done in 55 communities (46 percent) which included 61 percent of the families. Forty-four percent of the communities, including 30 percent of the families, contributed no vaccinations during the study year. The smaller number of surveyed families per community in this last group would make for more localities without vaccinations but would not account for anything like all of them being without vaccinations.

Relation of smallpox epidemics to the frequency of vaccination.—The 12 localities that contributed nearly three-quarters of the vaccinations have all been classed as having epidemics or facing threatened epi-

[9] About 2 percent of the total population of all ages, as enumerated in the census of 1930, were 6 years old; if every child were vaccinated at school entrance these vaccinations would amount annually to only 20 per 1,000 total population. Revaccination every 7 years would mean that 1/7 of the population is vaccinated every year, or an average annual rate of 143 vaccinations per 1,000 population.

demics; the threatened epidemic, however, was not always within their own county. In table 15, the three vaccination classes of communities shown in table 14 have been further classified according to whether the smallpox cases reported [10] constituted an epidemic anywhere within the county. Since reported cases of smallpox were not available for the small communities, it was necessary to consider the county as the unit. "Epidemic", as used here, means that more than the usual number of cases of smallpox were reported; rather small numbers of cases were sometimes considered epidemic if they were concentrated within 1 or 2 months.

TABLE 15.—*Comparison of the epidemic presence of smallpox as reported to health departments for the whole populations of surveyed localities where there were large numbers of vaccinations in the surveyed families during the study year with that in communities where there were few vaccinations and where there were no vaccinations—119 surveyed localities with 10 or more families under observation during 12 consecutive months, 1928–31*

Vaccinations in the surveyed families during the year of the study	Localities			Families			Vaccinations		
	Total	Smallpox was— Epidemic in the city or county	Smallpox was— Not epidemic in the city or county	Total	Smallpox was— Epidemic in the city or county	Smallpox was— Not epidemic in the city or county	Total	Smallpox was— Epidemic in the city or county	Smallpox was— Not epidemic in the city or county
	Percentage								
Localities with large numbers of vaccinations (20 or more per 100 families)	100.0	75.0	25.0	100.0	86.7	13.3	100.0	85.4	14.6
Localities with few vaccinations	100.0	23.6	76.4	100.0	25.2	74.8	100.0	22.5	77.5
Localities with no vaccinations	100.0	28.9	71.1	100.0	30.6	69.4	-------	-------	-------
	Number								
Localities with large numbers of vaccinations (20 or more per 100 families)	12	9	3	807	700	107	894	763	131
Localities with few vaccinations	55	13	42	5,328	1,344	3,984	311	70	241
Localities with no vaccinations	52	15	37	2,578	789	1,789	-------	-------	-------

In 9 places, or 75 percent, of the 12 communities with large numbers of vaccinations, including 87 percent of the families in the 12 communities, smallpox was epidemic within the town or county. On the other hand, smallpox was epidemic in only 24 percent of the 55 localities with few vaccinations and in 29 percent of the 52 localities with no vaccinations. Thus it appears that localities with few or no vaccinations are chiefly those without epidemics and localities with large numbers of vaccinations are chiefly those with epidemics. Reference

[10] Resort to health department records was necessary because the expectancy of smallpox is too small to be obtained from the survey records of the limited numbers of families canvassed in a given community.

to the table indicates that the distribution of families and vaccinations as between epidemic and nonepidemic counties shows the same association between large numbers of vaccinations and the presence of a smallpox epidemic.

In the nine communities with large numbers of vaccinations with smallpox epidemic in the town or county, the vaccinations were highly concentrated in the months in which the largest numbers of smallpox cases were reported, thus indicating that the presence of smallpox supplied the motive for vaccinating or the occasion for health officials to urge vaccination. The following facts about the nine communities may be of interest:

In a New York town of about 12,000 population there were 344 vaccinations in the 99 families under observation. Twenty-one cases of smallpox were reported to the health department during the first 5 months of 1930 (16 in April), and 334 of the vaccinations occurred in the same 5 months (125 in April). Sixty-eight percent of the 502 persons under observation in this town were vaccinated during the study year. Two cases of smallpox were reported in the surveyed families, but there were no deaths from smallpox in the whole of New York State in 1929 or 1930.

In an Indiana city of about 32,000 population, there were 139 vaccinations in the 83 families included in the survey. In the 6 months from December 1929 to May 1930 there were 235 cases of smallpox in the county (reports not available for the city alone), and 130 of the 139 vaccinations in the canvassed families occurred during this 6-month period.

The other seven communities with large numbers of vaccinations in the face of an epidemic need not be described in detail. They include an Ohio city of about 105,000 population with 70 vaccinations in the 91 families under observation; an Indiana city of about 115,000 with 47 vaccinations in the 126 families under observation; one Kansas town of about 14,000 with 20 vaccinations in the 91 families under observation and another of about 10,000 population with 33 vaccinations in the 73 families under observation; a Colorado town of about 11,000 with 29 vaccinations in the 31 families under observation; an Ohio town of about 2,700 population with 42 vaccinations in the 86 families under observation; and a Wisconsin town of about 2,300 with 33 vaccinations in the 39 families under observation.

Vaccinations in the above-named places all amounted to 20 or more per 100 families under observation (40 to 50 per 1,000 persons). Places with less than this number were classed as having few vaccinations, and in the great majority of localities there were very few or no vaccinations in spite of the fact that in about one-fourth of the communities smallpox was epidemic in the city or county. The presence of smallpox in the community may go unnoticed unless the health department makes use of the occasion to urge vaccinations, as is commonly done according to a Michigan report (11, 1929, p. 48).

The three communities with large numbers of vaccinations in which smallpox was not epidemic in the town or county are of special interest.

In a New York village of about 1,200 population, there were 81 vaccinations in the 49 families included in the survey. One case of smallpox (not fatal) was reported to the health department as occurring in the village in April 1930, and

73 of the 81 vaccinations in the surveyed families were done in that month. Since there was only the one smallpox case in the whole county, the disease could not be classed as epidemic, but its presence in the community was clearly associated with the large number of vaccinations.

In another New York village of about 500 population, there were 17 vaccinations in the 45 families included in the survey. No case of smallpox was reported in the whole county during the year of the study, but in an adjacent county 26 cases occurred in November and 3 in December of 1930 (no deaths). Of the 17 vaccinations in the surveyed families, 1 was done in November and 13 in December of 1930, suggesting that the neighboring epidemic was the reason for the vaccinations.

In a town of about 1,800 in Wisconsin, there were 33 vaccinations in the 16 families under observation. There were no cases reported to the health department as occurring anywhere in the county during the year of the survey. However, there were 4 cases in January of 1930 in an adjacent Wisconsin county and 4 cases in January, 2 in February, and 4 in March in an adjacent county of the upper peninsula of Michigan. Since 23 of the 33 vaccinations in the surveyed families were done in February and 7 in March of 1930, it appears probable that smallpox in these adjacent counties supplied the motive for the vaccinations.

No information is available on the activities of the health departments in these or other localities in the survey, but the connection between smallpox in an adjacent county and vaccinations in a given community may represent a vaccination campaign by the health department rather than any general fear of the spread of smallpox. During 1924, when the severe form of smallpox was epidemic in Detroit, there were 813,000 vaccinations in the then population of 1,194,000 (8, p. 42).

TABLE 16.—*Age distribution of smallpox vaccinations in communities having large numbers of vaccinations in the face of a smallpox epidemic or threatened epidemic compared with that in communities with scattered vaccinations only—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Vaccinations in the surveyed families during the year of the study	All known ages	Under 5	5–9	10–14	15–19	20–34	35–54	55 and over
	Percentage of the vaccinations that were in each age group							
12 localities with large numbers of vaccinations (20 or more per 100 families) in the face of a smallpox epidemic or threatened epidemic	100.0	12.3	31.8	19.0	8.4	15.0	12.0	1.5
55 localities with few vaccinations	100.0	39.3	38.1	9.4	4.5	3.2	5.2	.3
	Number of vaccinations							
12 localities with large numbers of vaccinations in the face of a smallpox epidemic or threatened epidemic	893	110	284	170	75	134	107	13
55 localities with few vaccinations	310	122	118	29	14	10	16	1

Age distribution of vaccinations in the face of epidemics.—A consideration of the age distribution of the persons currently vaccinated in the different categories of localities is of interest (table 16). In the 12

communities with large numbers of vaccinations in the face of an epidemic or threatened epidemic, 12 percent of the vaccinations were of children under 5 years and 29 percent were of persons over 20 years old. In the 55 localities with scattered or few vaccinations only, the average age of vaccination was much younger, 39 percent of the persons vaccinated during the study being under 5 years and only 9 percent over 20 years of age.

Seasonal distribution of vaccinations in the face of epidemics.—The data already presented suggest that vaccinations, particularly in the face of epidemics, have a seasonal distribution like smallpox cases.

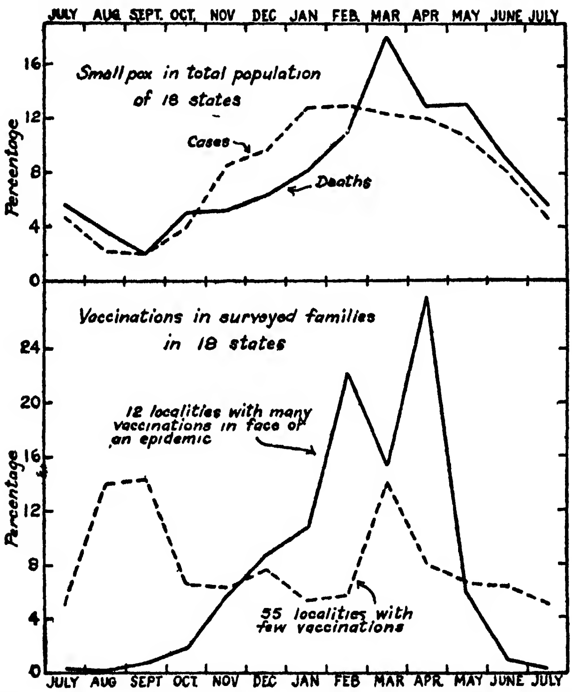

FIGURE 9.—Percentage of vaccinations and of smallpox cases and deaths in each month (30-day basis)—vaccinations in 8,758 surveyed families, 1928–31; cases and deaths in the general population, 1929–30.

Table 17 and figure 9 show for the surveyed population the percentage of vaccinations in each month, and for the general population the percentage of smallpox cases and deaths in each month, adjustment in all instances being made for the varying length of the months. Considering the few localities included in the group with many vaccinations in the face of an epidemic or threatened epidemic, the seasonal distribution of these vaccinations is fairly similar to that of smallpox cases but is more like that of smallpox deaths. In the communities with few vaccinations, relatively more of the vaccinations occur in August and September, apparently in preparation for

TABLE 17.—*Seasonal distribution of smallpox vaccinations in the surveyed families and of smallpox cases and deaths in the general population*

	All months		July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	Number	Percent	Percentage in each month (corrected to 30-day basis)											
Vaccination in the surveyed population,[1] 1928–31:														
12 localities with large numbers of vaccinations (20 or more per 100 families) in the face of a smallpox epidemic or threatened epidemic	894	100.0	0.3	0.1	0.7	1.8	5.7	8.7	10.7	22.2	15.3	27.8	5.8	0.9
55 localities with few vaccinations	311	100.0	5.0	14.0	14.3	6.7	6.3	7.7	5.3	5.7	14.0	8.0	6.7	6.3
All localities [1]	1,205	100.0	1.5	3.6	4.1	3.1	5.9	8.5	9.3	18.0	14.9	22.7	6.1	2.3
Smallpox [2] in the total population of the 18 surveyed States, based on calendar years 1929–30:														
Cases	52,496	100.0	4.7	2.2	2.0	3.9	8.5	9.7	12.8	13.0	12.4	12.0	10.7	8.1
Deaths	157	100.0	5.6	3.7	2.0	5.0	5.2	6.3	8.1	11.0	18.1	12.9	13.1	9.0
Smallpox [2] in the total population of the Continental United States:														
Based on calendar years 1929–30:														
Cases	91,189	100.0	4.5	2.1	1.8	3.4	7.1	8.8	12.7	13.2	13.6	13.1	11.1	8.6
Deaths	347	100.0	5.2	4.1	3.5	2.9	5.2	6.7	8.2	14.5	15.7	14.0	11.3	8.7
Based on medians for the 7 years 1922–28:														
Cases	31,067	100.0	4.5	2.5	1.8	2.9	5.4	7.8	14.6	15.8	13.7	12.7	10.7	7.6

[1] Excludes localities with less than 10 families under observation.
[2] Cases from Notifiable Diseases in States (12) and deaths from Mortality Statistics (7) supplemented by State reports (12) for South Dakota in 1929 and Texas in 1929 and 1930.

the opening of school; there is also a peak in March, when the peak in smallpox deaths occurs. It will be remembered that smallpox was epidemic in nearly one-fourth of these communities with few vaccinations (table 15), and the March peak probably reflects the influence of these epidemics although no large number of vaccinations occurred.

SMALLPOX VACCINATIONS IN ATTACKED HOUSEHOLDS

Vaccinations prior to the study.—The vaccinal status of the families attacked by smallpox is of interest. Of the 67 persons in the 14 households which were attacked during the 12-month study, 48 persons, or 72 percent, had never been vaccinated or had a case, as compared with 43 percent in the whole surveyed group. Twelve persons, or 18 percent, of the 67 in the attacked households had been vaccinated at some time, as compared with 54 percent in the whole surveyed group; in 10 of the 12 persons the vaccination was more than 7 years previous to the study and in another the time was not ascertained. Of the 67 individuals, 7 persons, or 10 percent, had suffered attacks of smallpox prior to the study, as compared with 3 percent in the whole surveyed group. However, 5 of the 7 persons were in one family; hence, only 3 of the 14 families had been previously attacked by smallpox.

Of the 31 children under 15 years of age in attacked households, none had been vaccinated, as compared with 41 percent in the whole surveyed group. The data suggest that the households that were attacked by smallpox during the study had less vaccinal protection and more histories of prior smallpox than the average for the whole surveyed group.

Vaccinations during the 12-month study.—Of the 32 persons in attacked households who had never been vaccinated and who were not attacked, 22 persons, or 69 percent, were vaccinated during the year.[11] Only 2 of the 9 individuals, 22 percent, who had been vaccinated more than 7 years previously and who were not attacked were vaccinated during the year.

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[11] Of the 22 vaccinations, 16 were done just before or just after the onset of the case in the household and presumably as a protection against it or the case to which it was exposed; 4 vaccinations of nonattacked persons were done some weeks prior to the case and hence could not be the result of the presence of the case in the household; the other 2 vaccinations were done about a month after the case on children who were temporarily away from the household at the time of the case.

SMALLPOX CASES IN THE OBSERVED POPULATION

There were 17 cases [12] of smallpox in the whole surveyed population, which gives an annual case rate of 44.1 per 100,000 persons as compared with a reported average annual rate for the United States of 37.1 for the years 1929–30, a period approximating that covered by the survey. When one takes into account possible incompleteness [13] of the reports to the health departments, the rate in the surveyed group seems to be about what obtained in the United States at that time.

Data are available on the vaccinal status of all persons in the observed population. The cases of smallpox are too few and scattered [14] to afford a reliable comparison of the incidence of the disease in vaccinated and unvaccinated groups, but it will be of interest to make the comparison for what it is worth. Table 18 shows, by age, smallpox incidence among the total observed population, among those not vaccinated within 7 years (including those never vaccinated), and among those never vaccinated. In all categories, and particularly among the unvaccinated, smallpox rates are higher from 5 to 15 years than before or after those ages, in general agreement with the findings of Stocks for the Metropolitan Borough of Stepney in London (18, p. 220).

Sixteen of the 17 smallpox cases in the observed population occurred among persons with no history of vaccination or case, a rate of 96 per 100,000 population, as compared with a rate of 5 per 100,000 (1 case) among persons who had been vaccinaed or had had a case (table 19). The 1 case occurred in a person vaccinated 40 years

[12] The 17 cases of smallpox occurred in 14 households, 12 families having only 1 case, 1 family 2 cases (1 secondary), and 1 family 3 cases, but with onsets all on the same date, so all were primary cases. There was a total of 67 persons in the attacked households; the 17 cases give an attack rate of 25 per 100 persons in attacked families. Of the 17 cases, 16 occurred among 48 individuals who had never been vaccinated, an attack rate of 33 per 100. Among 10 persons who had been vaccinated more than 7 years previously, 1 case occurred (vaccinated 40 years previously), an attack rate of 10 per 100.

Ten of the 17 cases occurred among the 31 persons under 15 years of age, an attack rate of 32 per 100, as compared with 19 per 100 among the 36 persons over 15 years old. Among the 17 persons over 15 years of age who had never been vaccinated or suffered a prior attack, 6 cases occurred, an attack rate of 35 per 100, which is about the same as that among the children under 15 years, none of whom had been vaccinated. Stocks found attack rates among unvaccinated contacts as high in adult ages as in childhood (18, p. 220).

[13] A canvass of over 27,000 families, including nearly 120,000 individuals, in various counties of Illinois (10, p. 28) indicated that 67 percent of the 425 smallpox cases that occurred in the group during 1929 were reported to the health department. In general a slightly higher percentage of the cases was reported in the counties with large cities than in the more rural counties.

[14] The 14 attacked households (17 cases) were distributed as follows:

State	Number of families attacked	Number of cases of smallpox	Number of families under observation
Indiana	8	11	494
Washington	3	3	551
New York	2	2	1,710
Ohio	1	1	1,148

previously, a rate of 8 per 100,000 in the group with a history of vaccination 7 or more years previously.

TABLE 18.—*Age incidence of smallpox in the total observed population and in relatively nonimmune parts of that population—canvassed white families in 18 States during 12 consecutive months, 1928–31*

	All ages [1]	Age: Under 5	5–9	10–14	15–34	35 and over
Total observed population:						
Number of persons (years of life)	[1] 38,544	5,513	5,715	4,568	10,809	11,752
Number of cases	17	3	4	3	4	3
Annual case rate per 100,000	44	54	70	66	37	26
Persons with no history of vaccination within 7 years or of a prior case at any time:						
Number of persons	[1] 28,396	[2] 4,907	2,884	2,099	8,325	10,084
Number of cases	17	3	4	3	4	3
Annual case rate per 100,000	60	61	139	143	48	30
Persons with no history of vaccination or prior case at any time:						
Number of persons	[1] 16,603	[2] 4,907	2,849	1,547	3,302	3,910
Number of cases	16	3	4	3	4	2
Annual case rate per 100,000	96	61	140	194	121	51

[1] "All ages" includes a few of unknown age.
[2] "Under 5 years" includes 441 years of life for the 761 children born during the study who are excluded from the history of vaccination tables because the histories are recorded as of the beginning of the study before these children were born. Since they are exposed to the risk of attack, they belong in any table of current rates.

TABLE 19.—*Annual incidence of smallpox in unvaccinated and vaccinated groups of the surveyed population—canvassed white families in 18 States during 12 consecutive months, 1928–31*

	Number of persons under observation	Case rate per 100,000	Actual number of cases	Expected number of cases if there had been no history of vaccination or case (age corrected) [1]
No history of a vaccination or prior case	16,603	96.4	16	16
History of a vaccination or case at any time	21,719	4.6	1	23
History of vaccination 7 or more years prior to study	11,793	8.5	1	10
History of vaccination within 7 years of study	8,769	....	0	12
History of a case	1,157	....	0	1

[1] Expected cases obtained by applying age specific rates (table 18) for persons who had never been vaccinated to the numbers of persons in the various ages in the group under consideration.
The significance of the difference between the expected and actual number of cases for a given group was tested as follows: (*a*) An expected rate was computed by dividing the expected cases by the number of persons in the group; (*b*) the standard error of the *expected number* of cases was computed by the formula, $\sigma=\sqrt{npq}$, in which n=number of persons in group, p=expected rate per person, and $q=1-p$; (*c*) difference between actual and expected number of cases, x, was divided by the standard error, σ, as computed above; (*d*) from tables of $\frac{x}{\sigma}$ in Pearl's Medical Biometry and Statistics (2d ed., p. 440), the probability of a chance deviation as great as, or greater than, that occurring in this case was obtained.
The results indicate that the actual cases are significantly lower than expected for all except the last group (history of a prior case). The number of individuals in this group is too small to obtain reliability when dealing with as small a rate as that for smallpox.

The age specific rates in table 18 for persons who had never been vaccinated have been applied to the population of different ages in the several groups shown in table 19. Among the 21,719 persons who had been vaccinated or had suffered an attack, there was 1 case,

as compared with an expectancy of 23 cases if the rates had been what they were in the unvaccinated group; among the 11,793 who had been vaccinated 7 or more years previously, the expectancy was 10 cases, with only 1 case occurring; in the 8,769 persons vaccinated within 7 years, there was an expectancy of 12 cases, but none occurred, and in the 1,157 with a prior attack of smallpox there was an expectancy of 1 case, but none occurred. With the exception of the last group the differences between the actual and expected numbers of cases are much greater than would occur on the basis of chance. The number of persons who had previously suffered attacks is not large enough to obtain a statistically significant expectancy of cases from so small an incidence rate as prevails in smallpox; however, there is no question about the immunity of persons previously attacked by smallpox.

TABLE 20.—*Age incidence of smallpox in Detroit, Mich., and in a group of rural Michigan counties (no towns over 2,500 in 1930) which had no county health department—reported smallpox in 1929 and 1930* [1]

Age	Annual case rate per 100,000 population						Number of smallpox cases reported					
	Detroit (1,568,662) with large health department			Rural counties [2] without health departments			Detroit with large health department			Rural counties [2] without health departments		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6.9	9.1	4.6	102.2	111.0	92.1	218	149	69	377	218	159
Under 5	3.8	3.3	4.2	102.7	98.4	107.2	11	5	6	37	18	19
5–9	6.1	6.0	6.1	138.7	169.7	107.5	18	9	9	57	35	22
10–14	3.0	3.0	3.0	162.4	169.6	155.1	8	4	4	70	37	33
15–19	5.3	8.4	2.8	179.8	166.0	196.2	13	10	3	68	34	34
20–24	15.8	23.9	7.9	89.0	123.0	45.9	48	36	12	22	17	5
25–34	9.5	13.5	4.9	78.7	67.4	91.3	63	48	15	31	14	17
35–44	4.7	7.3	1.3	82.5	105.6	56.7	26	23	3	37	25	12
45–54	6.8	6.1	7.7	72.4	89.7	52.2	20	10	10	30	20	10
55 and over	4.9	3.7	6.1	29.8	40.6	15.4	11	4	7	18	14	4

[1] Data from annual reports of the Michigan State Department of Health

[2] The counties included are Arenac, Baraga, Benzie, Clare, Gladwin, Huron, Keweenaw, Lake, Leelanau, Luce, Mackinac, Newaygo, Oceana, Ontonagon, Osceola, and Sanilac The population in 1930 for the 16 counties was 184,514 Counties having health departments on Jan 1, 1931 (15), are excluded, as they presumably existed for at least a part of the 2-year period covered

AGE AND SEX INCIDENCE OF SMALLPOX AS REPORTED TO THE MICHIGAN STATE HEALTH DEPARTMENT

In the absence of sufficient data from the surveyed group, reported smallpox cases in Michigan (11) are used to indicate in more detail the age curve of the disease. Since the age incidence varies from place to place and from year to year, because of variation in the vaccinal status of the population, several curves are given. Table 20 shows the data for Detroit and for a group of rural counties which were without full-time county health officers, and none of which contained a town as large as 2,500. Presumably these rural counties

low in vaccinal history and presumably Detroit was reasonably well vaccinated, for about three-fourths of its population were vaccinated in 1924 and a considerable number of vaccinations are done annually (8, p. 42). The smallpox data are for the years 1929 and 1930.

Considering first the actual incidence at all ages, the rural rate is 15 times the Detroit rate; among children under 20 years the average in the rural areas (146 per 100,000) is 32 times that in Detroit (4.6). At 20–24 years, when there is a high peak in Detroit, the rural rate is more than 5 times the Detroit rate. Reporting is probably more complete in Detroit than in the rural counties, and so the observed differences are an understatement rather than an overstatement of the facts.

Figure 10 is designed to compare the age curves rather than the actual incidence, its scales being arranged to make the curves comparable on a relative basis. In the presumably unvaccinated rural areas, smallpox has its highest incidence among persons under 20 years of age, with a decline as age increases beyond that point. In Detroit the rates are low under 20 years and among older people; the relatively high rate for young adults is presumably due to the migration of unvaccinated persons from rural areas to work in Detroit.

The city of Flint (156,000 population) had an epidemic of 515 cases of smallpox in 1929 and 98 cases in 1930. During 1929, in connection with the campaign to stamp out the disease, there were about 10,000 vaccinations, which was 4 or 5 times as many as in normal years (9). Although the ages of persons vaccinated are not reported, it is probably safe to assume that a higher proportion of school children were vaccinated than persons in other age groups. Table 21 and figure 10 show age-specific smallpox case rates for each of the years 1929 and 1930. All the rates are lower in 1930—the comparison of the relative age incidence is the point under consideration. In 1929 the highest rates are for the school ages, but in 1930 (after the vaccinations of 1929) the school ages have lower rates than adults. The young adult peak suggests the possibility of some epidemic in a factory that did not spread to other places or to the schools.

Edwardes (14, p. 101) gives smallpox cases in different age groups in vaccinated and unvaccinated populations in certain European countries and shows the reversal of smallpox from a childhood disease to one of the older ages by the practice of vaccination.

SMALLPOX MORTALITY IN THE UNITED STATES

Since there were no smallpox deaths among the 17 cases in the surveyed families, mortality data for the general population are used. In the continental United States there were 91,189 cases (white and colored) of smallpox reported in 1929 and 1930, an annual inci-

dence rate of 37.1 per 100,000. The total of 347 deaths registered[15] gives an annual mortality of 1.41 per million, and a case fatality of 0.38 percent.[16] To express it in another way, there were 263 cases reported for each death registered. Evidently there was little smallpox of the malignant type in these years.

Table 22 and figure 11 show by age and sex the mortality from smallpox in the white population of the registration States. The mortality curve shows the usual high rates in the very young and the very old, and does not resemble any of the case incidence curves that are shown in figure 10. At both extremes of life the mortality of males

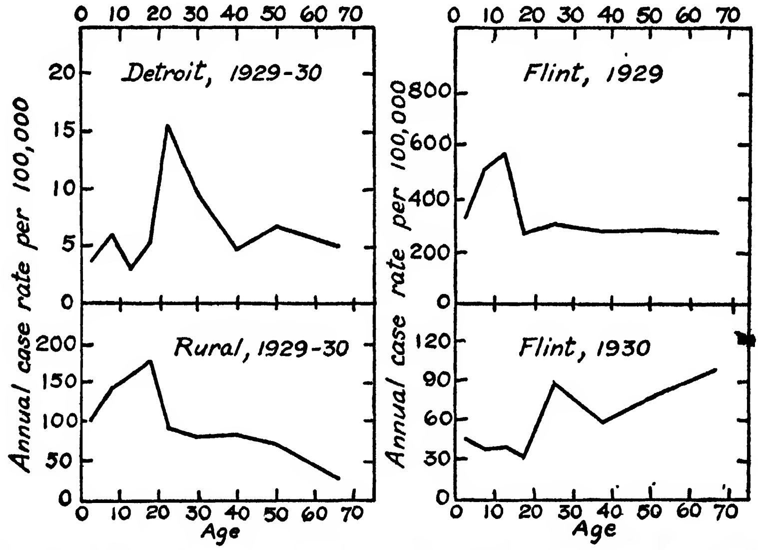

FIGURE 10.—Age incidence of smallpox as reported to health departments in certain localities in Michigan, 1929–30. (Rural includes 16 counties with no town over 2,500 in population and no county health department. See footnote to table 20 for names of counties. Scales are so made that the rate for all ages represents an interval on the vertical rate scale that corresponds to approximately 20 years on the horizontal age scale.)

exceeds that of females, but there is little difference between the sexes among young and middle-aged adults.

REACTIONS FOLLOWING VACCINATION

Of the 1,209 vaccinations in the canvassed group, 72, or 6 percent, were reported as being accompanied by reactions of sufficient severity to cause loss of time from school, work, or other usual activities; and of these, 51, or 4.2 percent of the total vaccinations, caused the patient to remain in bed for 1 or more days. Table 23 shows the data by age.

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[15] Mortality Statistics (7) supplemented by State reports (12) for South Dakota in 1929 and Texas in 1929 and 1930.

[16] The Michigan reports (11) show for 1929 and 1930 a total of 4,785 cases, or an annual incidence rate of 49.4 per 100,000, with 18 deaths, or an annual mortality of 1.86 per million, and a case fatality of 0.38 percent.

The higher percentages for the school ages may represent less reluctance to remain away from school rather than more frequent reactions.

The period of disability was short, 40 percent of the disabling cases involving loss of 1 or 2 days only, and 81 percent involving not more than 5 days. Of the bed cases, 51 percent were in bed for 1 or 2 days only, and 84 percent for 3 days or less, the average time in bed for bed cases being 2.7 days.

WHERE VACCINATIONS WERE DONE AND THE SERVICE RECEIVED

Of all vaccinations during the 12-month study, 42 percent were done in public clinics or by school physicians. This may be contrasted with 57 percent of diphtheria immunizations, 52 percent of

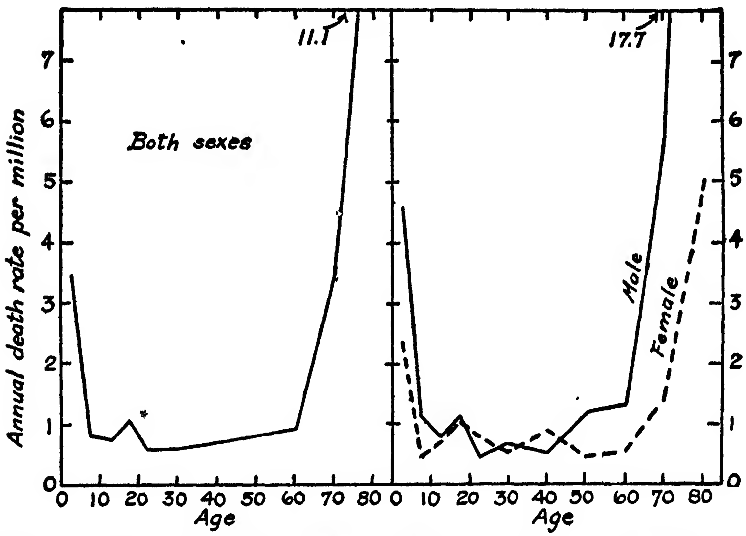

FIGURE 11.—Smallpox mortality at specific ages for each sex—white population in the registration States, 1929–30. (Scale is so made that the rate for all ages of both sexes represents an interval on the vertical rate scale that corresponds to approximately 20 years on the horizontal age scale.)

typhoid, and 36 percent of scarlet fever immunizations, and 3 percent of cases given cold vaccine. Of the smallpox vaccinations done by public clinics, 91 percent were free, and in the others a fee of some kind was paid, including those with a nominal charge only.

Considering the percentage of vaccinations at different ages that were done in public clinics or by school physicians, the figure rises from 37 percent under 5 years to 48 percent at 5 to 9 years and to a maximum of 60 percent at 10 to 14 years. After the peak the percentage declines to 41 percent at 15 to 19 years, 29 percent at 20 to 44 years, and 19 percent among persons 45 years old and over.

Of all the vaccinations, 2.2 percent were reported as done by specialists (nearly all by pediatricians), and 6.6 percent had a visiting nurse on the case, presumably to urge that the vaccination be done.

Of all the vaccinations, 81.3 percent had only one call to the physician, 16.3 percent had two calls, and 2.4 percent had three or more calls. There was an average of 1.24 calls per vaccination.

IV. SUMMARY

Information on the history of smallpox vaccinations and cases at any time and more detailed records of vaccinations and other medical care during a 12-month period between 1928 and 1931 were obtained on 8,758 white families in 130 localities in 18 States. Each family was visited at intervals of 2 to 4 months to collect the data.

TABLE 21.—*Comparison of the age incidence of smallpox in Flint, Mich., in 1929 and in 1930* [1]

Age	Annual case rates per 100,000 population						Number of cases of smallpox reported					
	Both sexes		Male		Female		Both sexes		Male		Female	
	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930
All ages	329 1	62.6	344.3	67.2	312.4	57.6	515	98	282	55	233	43
Under 5	319 6	47.3	325 1	11.6	313.9	84.5	54	8	28	1	26	7
5-9	507.5	37 1	452.0	36.7	564.5	37.6	82	6	37	3	45	3
10-14	557.2	38.2	530.0	31 2	583.2	44.9	73	5	34	2	39	3
15-19	262 0	31 8	373.4	17.0	164.1	44.7	33	4	22	1	11	3
20-29	299.7	89.0	316 1	112.9	281.5	62.6	101	30	56	20	45	10
30-44	267 5	58.3	267.1	57.2	268.0	59.6	101	22	56	12	45	10
45-54	277.4	78.2	348.4	118.7	181.2	57.6	39	11	49	16	22	7
55 and over	263.4	98.8					32	12				

[1] Data from annual reports of the Michigan State Department of Health. Population of Flint in 1930 was 156,492.

The surveyed families include representation from nearly all geographic sections, from rural, urban, and metropolitan areas, from all income classes, and of both native- and foreign-born persons. The proportions of these various elements included are not identical with those in the population of the United States, but the variations are not generally large. In other respects also the surveyed group is not dissimilar to families in the general white population of the United States.

Considering the whole group, about 70 percent of adults gave a history of smallpox vaccination or case at some time; 65 percent gave a history of vaccination, and 5 percent gave a history of an attack (fig. 1).

Only 10 to 20 percent of the children had been vaccinated before the age of school entrance; most of the vaccinations were done be-

tween 5 and 10 years of age and 85 to 90 percent of adults had not been vaccinated within 7 years (fig. 1).

Males and females were not significantly different with respect to smallpox vaccination and case histories (fig. 2).

Among persons living in cities, larger percentages had been vaccinated and smaller percentages had suffered attacks of smallpox than in rural areas (fig. 3). This statement is true for each of four geographic regions included in the study (fig. 5).

TABLE 22.—*Annual smallpox mortality at specific ages for each sex—white persons in the registration States,*[1] *1929–30*

	All ages	Age										
		Under 5	5–9	10–14	15–19	20–24	25–34	35–44	45–54	55–64	65–74	75 and over
Annual death rate per million:												
Both sexes	1.31	3.49	0.81	0.74	1.09	0.61	0.63	0.71	0.84	0.93	3.62	11.07
Male	1.67	4.57	1.13	.78	1.14	.45	.69	.53	1.19	1.29	5.74	17.72
Female	.94	2.36	.48	.70	1.04	.76	.56	.90	.46	55	1.42	5.02
Number of deaths:												
Both sexes	273	66	17	15	21	11	20	21	19	14	31	38
Male	176	44	12	8	11	4	11	8	14	10	25	29
Female	97	22	5	7	10	7	9	13	5	4	6	9

[1] Registration States included all except Texas and South Dakota in 1929 and all except Texas in 1930

TABLE 23.—*Proportion of smallpox vaccinations which caused disability for one or more days (inability to pursue usual activities) and which caused the person to remain in bed for one or more days*

	All ages[1]			Both sexes					
	Both sexes	Male	Female	Under 5	5–9	10–14	15–19	20–44	45 and over
Total number of vaccinations	1,209	591	618	232	402	199	90	216	68
Number with disability	72	37	35	5	33	17	5	9	2
Percentage with disability	6.0	6.3	5.7	2 2	8.2	8.5	5 5	4.2	2.9
Number in bed	51	29	22	5	23	12	2	7	1
Percentage in bed	4.2	4.9	3.6	2.2	5.7	6.0	2.2	3.2	1.5

[1] All ages includes 2 of unknown age.

Vaccinations during the 12 months of the morbidity study amounted to 31 per 1,000 population of all ages; under 20 years the rate was 49 per 1,000. These rates seem to be about the same as had occurred in preceding years, as judged by the history data.

Vaccinations were more frequent in low- and high-income groups than in the intervening economic classes (fig. 7).

About 74 percent of the vaccinations during the study year were done in 10 percent of the localities. In every locality where large numbers of vaccinations occurred there was an epidemic or threatened epidemic of smallpox. Epidemics in some localities, however, failed to stimulate large numbers of vaccinations.

Of the 17 cases of smallpox that occurred in the observed population, 16 were among persons never vaccinated, a rate of 96 per 100,000, as compared with 1 case (vaccinated 40 years previously), or a rate of 5 per 100,000 among persons who had been vaccinated at any time.

Smallpox rates at specific ages based on reported cases in rural and urban parts of Michigan indicate that the prevalence of vaccination profoundly modifies the age incidence of the disease (fig. 10).

The relative age curve of smallpox mortality is radically different from that of the case incidence (fig. 11).

V. REFERENCES

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(9) Annual reports of the Health Department of Flint, Mich. (Typewritten copies supplied to the Library of the U. S. Public Health Service.)

(10) Annual report of the Illinois State Department of Health for the year ending June 30, 1930.

(11) Annual reports of the Michigan State Department of Health.

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PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period July–December 1935

There is printed herewith a list of publications of the United States Public Health Service issued during the period July–December 1935.

The most important articles that appear each week in the PUBLIC HEALTH REPORTS are reprinted in pamphlet form, making possible a wider and more economical distribution of information that is of especial value and interest to public health workers and the general public.

All of the publications listed below except those marked with an asterisk (*) are available for free distribution and as long as the supply lasts may be obtained by addressing the Surgeon General, United States Public Health Service, Washington, D. C. Those publications marked with an asterisk are not available for free distribution but, unless stated to be "out of print", may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., *at the prices noted.* (No remittances should be sent to the Public Health Service.)

Periodicals

Public Health Reports (weekly), July–December, vol. 50, nos. 27–52, pages 891 to 1848.

Venereal Disease Information (monthly), July–December, vol. 16, nos. 7–12, pages 223 to 432.

Reprints from the Public Health Reports

1693. Report of the Committee on Milk, Conference of State and Provincial Health Authorities, 1935. July 19, 1935. 4 pages.

1694. Milk-sanitation ratings of cities. Cities for which milk-sanitation ratings of 90 percent or more were reported by the State milk-sanitation authorities during the period July 1, 1933, to June 30, 1935. July 26, 1935. 3 pages.

*1695. Malaria epidemic in Aurora, Ohio. By R. N. Hoyt and R. D. Worden. July 5, 1935. 3 pages.

1696. Roentgenological appearances in silicosis and the underlying pathological lesions. Report by a committee composed of H. K. Pancoast, E. P. Pendergrass, A. R. Riddell, A. J. Lanza, Wm. J. McConnell, R. R. Sayers, H. L. Sampson, and L. U. Gardner. August 2, 1935. 8 pages.
1697. The control of communicable diseases. Report of a committee of the American Public Health Association. August 9, 1935. 61 pages.
1698. Dedication and opening of the Lexington Narcotic Farm. By W. L. Treadway. August 2, 1935. 5 pages.
1699. Public Health Service publications. A list of publications issued during the period January–June 1935. August 2, 1935. 4 pages.
1700. Control of rabies in New York City. By Robert Olesen. August 16, 1935. 20 pages.
1701. Height and weight of children of the depression poor. Health and depression studies no. 2. By Carroll E. Palmer. August 16, 1935. 7 pages.
1702. Acute response of guinea pigs to vapors of some new commercial organic compounds. VIII. Butanone. By F. A. Patty, H. H. Schrenk, and W. P. Yant. September 6, 1935. 12 pages.
1703. The maternity nursing service of a bicounty health department. Brunswick-Greensville health administration studies no. 5. Prepared by Pearl McIver. September 20, 1935. 16 pages.
1704. Directory of whole-time county health officers, 1935. September 20, 1935. 10 pages.
1705. The blacktongue-preventive value of 7 foodstuffs. By W. H. Sebrell, G. A. Wheeler, and D. J. Hunt. September 27, 1935. 9 pages.
1706. The accuracy of certified causes of death. Its relation to mortality statistics and the International List. (Report of the Committee, American Public Health Association.) September 13, 1935. 45 pages.
1707. Dust storms and their possible effect on health. With special reference to the dust storms in Kansas in 1935. By Earle G. Brown, Selma Gottlieb, and Ross L. Laybourn. October 4, 1935. 15 pages; 8 plates.
1708. Milk control and the United States Supreme Court. By James A. Tobey. October 4, 1935. 6 pages.
1709. A nonflammable pyrethrum spray for use in airplanes. By C. L. Williams and W. C. Dreessen. October 11, 1935. 4 pages.
1710. Age incidence of specific causes of illness. Based on records for 9,000 families in 18 States visited periodically for 12 months, 1928–1931. By Selwyn D. Collins. October 11, 1935. 25 pages.
1711. Cultivation of the virus of Rocky Mountain spotted fever in the developing chick embryo. By Ida A. Bengtson and R. E. Dyer. October 25, 1935. 10 pages; 3 plates.
1712. The urinary excretion of silica by persons exposed to silica dust. By J. J. Bloomfield, R. R. Sayers, and F. H. Goldman. March 29, 1935. 4 pages.
1713. Disabling illness among industrial employees in 1934 as compared with earlier years. By Dean K. Brundage. November 1, 1935. 13 pages.
1714. Extent of rural health service in the United States, December 31, 1930–December 31, 1934. November 1, 1935. 16 pages.
1715. Studies of sewage purification. III. The clarification of sewage—A review. By Emery J. Theriault. November 8, 1935. 15 pages.
1716. Physical condition and unemployment. By Harold S. Diehl. November 15, 1935. 9 pages.
1717. Microscopic appearance of experimentally produced dust nodules in the peritoneum. By J. W. Miller and R. R. Sayers. November 15, 1935. 10 pages; 6 plates.

1718. Further studies of the effect of radium upon bacteria. By R. R. Spencer. November 22, 1935. 14 pages; 4 plates.
1719. A technique which completely excludes air contamination of bacterial cultures. By R. R. Spencer. November 22, 1935. 2 pages; 1 plate.
1720. Influenza and pneumonia mortality in a group of about 95 cities in the United States during four minor epidemics, 1930–35, with a summary for 1920–35. By Selwyn D. Collins and Mary Gover. November 29, 1935. 21 pages.
1721. Studies on the minimal threshold of the dental sign of chronic endemic fluorosis (mottled enamel). By H. Trendley Dean and Elias Elvove. December 6, 1935. 11 pages.
1722. Job analysis of a rural health officer. Brunswick-Greensville health administration studies no. 6. Prepared by J. O. Dean. December 13, 1935. 12 pages.
1723. Cost of local enforcement of the United States Public Health Service milk ordinance. By A. W. Fuchs and L. C. Frank. December 13, 1935. 5 pages.
1724. State and insular health authorities, 1935. Directory, with data as to appropriations and publications. December 20, 1935. 18 pages.

Supplements to the Public Health Reports

115. The size distribution of industrial dusts. By J. J. Bloomfield. 1935. 9 pages.
116. Some Public Health Service publications suitable for general distribution. 1935. 23 pages.
117. The notifiable diseases. Prevalence in States, 1934. 1935. 12 pages.

Public Health Bulletins

217. The determination and control of industrial dust. By J. J. Bloomfield and J. M. DallaValle. April 1935. 167 pages.
218. Studies in illumination. IV. Daylight in buildings. A study of the effect of the height and width of windows and of the reflecting power of the walls and ceiling upon the natural illumination within a building. By James E. Ives, Frederick L. Knowles, and Lewis R. Thompson. April 1935. 52 pages.
220. Public Health Service milk ordinance and code. July 1935. 114 pages.
221. Anthraco-silicosis among hard coal miners. Engineering studies by J. J. Bloomfield and J. M. DallaValle; medical studies by R. R. Jones and Waldemar C. Dreessen; statistical analysis by Dean K. Brundage and Rollo H. Britten. With sections on autopsy material by J. W. Miller and on silica in the urine and in lung specimens by F. H. Goldman. December 1935. 114 pages; 45 plates.

National Institute of Health Bulletin

165. I. A method for quantitating neuromuscular irritability. The effect of certain drugs on the neuromuscular apparatus. By Maurice I. Smith. II. The pharmacologic action of some alcoholic phosphoric esters. By Maurice I. Smith. June 1935. 29 pages.

Unnumbered Publication

Index to Public Health Reports, vol. 50, part 1 (January-June 1935). 1935. 24 pages.

THE PICTURE OF HEART DISEASE MORTALITY OBTAINED FROM VITAL STATISTICS IN WASHINGTON, D. C., DURING 1932.—A CORRECTION

In the article with the above title, which appeared in the Public Health Reports for March 20, 1936, the first part of the last sentence in the paragraph at the bottom of page 286 should read, "When it is considered that few deaths from congenital heart disease" etc., instead of, "When it is considered that most deaths" etc.

DEATHS DURING WEEK ENDED MARCH 28, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar. 28, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	10,192	8,612
Deaths per 1,000 population, annual basis	14.2	12.0
Deaths under 1 year of age	674	571
Deaths under 1 year of age per 1,000 estimated live births	61	53
Deaths per 1,000 population, annual basis, first 13 weeks of year	13.8	12.8
Data from industrial insurance companies		
Policies in force	68,251,415	67,650,314
Number of death claims	14,510	13,584
Death claims per 1,000 policies in force, annual rate	11.1	10.5
Death claims per 1,000 policies, first 13 weeks of year, annual rate	11.0	10.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for weeks ended Apr. 4, 1936, and Apr. 6, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 4, 1936, and Apr. 6, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935
New England States:								
Maine			13	1	195	92	1	0
New Hampshire				19	35	1	0	0
Vermont	1				799	7	0	0
Massachusetts	4	9			1, 109	520	18	1
Rhode Island		2			48	242	0	1
Connecticut	1	4	24	5	50	1, 191	2	1
Middle Atlantic States:								
New York	57	38	[1] 17	[1] 7	2, 909	2, 983	21	27
New Jersey	18	20	26	16	324	1, 562	5	1
Pennsylvania	31	49			721	6, 227	14	4
East North Central States:								
Ohio	28	35	20	16	424	1, 520	7	13
Indiana	11	13	116	41	28	370	6	9
Illinois	43	37	61	21	24	2, 947	10	23
Michigan	11	18	12	13	110	3, 887	4	1
Wisconsin	2	3	69	86	111	1, 729	1	4
West North Central States:								
Minnesota	7	5			361	1, 056	2	1
Iowa	8	10	5	6	2	1, 889	1	5
Missouri	24	23	967	56	23	649	6	8
North Dakota		8	12	3		24	0	0
South Dakota	2	2		2	1	32	0	1
Nebraska	5	4	4		108	392	1	5
Kansas	15		81	3	9	1, 726	1	2
South Atlantic States:								
Delaware	6	1			21	22	1	0
Maryland [2]	6	8	80	17	292	61	9	7
District of Columbia	11	18	1	5	45	72	7	10
Virginia	7	14	909		151	938	10	5
West Virginia	6	15	229	120	80	440	9	1
North Carolina [3]	18	10	107	8	64	342	10	6
South Carolina	2	4	303	238	17	49	8	1
Georgia [3]	10	2	657				3	1
Florida [3]	3		12	1	18	77	1	1
East South Central States:								
Kentucky	8	4	202	36	77	738	48	1
Tennessee	6	4	552	78	70	82	10	2
Alabama [3]	17	5	1, 828	144	50	441	7	3
Mississippi [3]	4	3					0	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 4, 1936, and Apr. 6, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935
West South Central States:								
Arkansas	9	6	367	19	7	88	3	0
Louisiana	9	14	606	16	67	138	3	1
Oklahoma [4]	23	13	323	124	21	198	9	5
Texas [3]	42	56	902	614	423	163	8	0
Mountain States:								
Montana	-----	6	39	218	15	601	2	2
Idaho	-----	-----	4	4	15	33	0	0
Wyoming	-----	-----	-----	-----	-----	174	0	0
Colorado	10	5	-----	-----	25	381	2	1
New Mexico	8	6	85	14	54	38	0	2
Arizona	1	1	90	21	135	63	1	0
Utah [2]	-----	-----	3	-----	21	6	0	0
Pacific States:								
Washington	2	6	57	2	362	262	1	1
Oregon	1	-----	93	81	269	210	2	2
California	26	27	351	73	2,640	1,313	7	12
Total	493	508	9,172	2,073	12,280	35,976	256	174
First 14 weeks of year	8,475	9,953	108,276	93,384	117,137	352,180	3,250	1,826

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935
New England States:								
Maine	2	0	7	13	0	0	4	5
New Hampshire	0	0	9	7	0	0	2	0
Vermont	0	0	12	12	0	0	0	0
Massachusetts	0	0	368	261	0	0	2	2
Rhode Island	0	0	25	6	0	0	0	0
Connecticut	0	1	102	130	0	0	5	0
Middle Atlantic States:								
New York	1	0	1,159	1,271	0	0	9	4
New Jersey	0	1	522	171	0	0	2	0
Pennsylvania	0	1	639	757	0	0	7	9
East North Central States:								
Ohio	0	0	463	877	0	0	39	3
Indiana	0	0	264	204	5	0	0	0
Illinois	1	1	885	1,197	8	1	10	5
Michigan	0	1	347	247	0	0	3	5
Wisconsin	1	0	557	462	9	26	1	2
West North Central States:								
Minnesota	0	1	383	225	5	4	0	0
Iowa	0	0	221	50	30	3	2	1
Missouri	0	0	115	60	7	2	2	3
North Dakota	0	0	55	74	3	0	4	0
South Dakota	0	1	77	10	27	2	0	0
Nebraska	0	1	213	42	34	23	0	0
Kansas	0	0	362	57	35	23	0	1
South Atlantic States:								
Delaware	0	0	3	20	0	0	0	0
Maryland [3]	1	0	60	126	0	0	4	2
District of Columbia	0	1	16	113	0	0	1	0
Virginia	0	0	51	38	0	2	3	2
West Virginia	0	0	55	64	0	0	2	4
North Carolina [3]	1	3	32	29	4	1	4	11
South Carolina	0	0	2	5	0	0	0	1
Georgia [3]	0	0	15	7	0	0	0	2
Florida [3]	0	0	7	3	0	2	6	4
East South Central States:								
Kentucky	0	0	43	37	1	0	4	1
Tennessee	0	0	29	18	0	0	9	7
Alabama [3]	0	0	7	11	1	10	0	7
Mississippi [3]	1	0	6	3	0	0	0	2

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 4, 1936, and Apr. 6, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935	Week ended Apr. 4, 1936	Week ended Apr. 6, 1935
West South Central States:								
Arkansas	0	0	18	3	0	1	2	0
Louisiana	0	1	10	7	0	1	2	12
Oklahoma [4]	0	0	36	13	0	0	6	2
Texas [3]	0	3	59	60	5	105	2	20
Mountain States:								
Montana	0	0	101	7	6	3	0	0
Idaho	0	0	53	11	4	0	0	0
Wyoming	0	0	67	17	3	11	0	1
Colorado	0	0	193	277	10	16	0	0
New Mexico	0	0	90	16	0	3	0	3
Arizona	0	0	23	32	0	1	2	0
Utah [2]	0	0	71	92	1	0	0	1
Pacific States:								
Washington	0	0	106	57	5	15	1	2
Oregon	1	0	43	76	4	3	8	3
California	1	5	338	240	2	3	0	3
Total	10	21	8,319	7,515	209	261	148	130
First 14 weeks of year	272	356	109,573	99,950	3,213	2,749	1,563	1,796

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Mar. 28, 1936, 10 cases, as follows: North Carolina, 1; Georgia, 1; Florida, 1; Alabama, 3; Texas, 4.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
December 1935										
Vermont	-------	4	1	-------	534	-------	4	57	0	2
January 1936										
Vermont	-------	2	-------	-------	689	-------	2	68	1	1
February 1936										
Hawaii Territory	2	10	1,126	-------	8	-------	0	-------	0	4
Mississippi	5	18	35,092	1,473	825	123	0	65	0	8
Missouri	45	131	1,970	12	121	1	5	1,138	55	18
Texas	48	250	2,565	1,031	-------	15	1	429	-------	29
Vermont	-------	-------	-------	-------	1,370	-------	-------	78	0	1
March 1936										
Arkansas	14	36	2,289	50	33	26	1	65	4	3
Delaware	3	5	4	-------	188	-------	0	18	0	0
District of Columbia	25	99	16	-------	188	-------	0	104	0	1
Indiana	18	68	222	-------	47	-------	0	1,187	22	5
Iowa	18	46	36	1	12	-------	1	978	78	10
Nebraska	4	29	13	-------	202	-------	4	841	139	0
New Mexico	8	12	104	-------	212	3	-------	346	2	7

December 1935

	Cases
Vermont:	
Chicken pox	501
German measles	72
Mumps	173
Septic sore throat	1
Undulant fever	1
Whooping cough	191

January 1936

	Cases
Vermont:	
Chicken pox	327
German measles	64
Mumps	177
Whooping cough	166

February 1936

	Cases
Chicken pox:	
Hawaii Territory	51
Mississippi	585
Missouri	368
Vermont	144
Dengue:	
Mississippi	2
Dysentery:	
Hawaii Territory (amoebic)	3
Mississippi (amoebic)	44
Mississippi (bacillary)	241
Missouri	9
Epidemic encephalitis:	
Hawaii Territory	1
Missouri	2
German measles:	
Vermont	167
Hookworm disease:	
Mississippi	208
Leprosy:	
Hawaii Territory	2
Mumps:	
Hawaii Territory	8
Mississippi	2,079
Missouri	1,268
Vermont	120

February 1936—Continued

	Cases
Ophthalmia neonatorum:	
Missouri	1
Paratyphoid fever:	
Hawaii Territory	1
Texas	1
Puerperal septicemia:	
Mississippi	17
Rabies in animals:	
Mississippi	38
Missouri	3
Septic sore throat:	
Missouri	77
Trachoma:	
Mississippi	8
Missouri	4
Tularaemia:	
Missouri	1
Typhus fever:	
Hawaii Territory	1
Mississippi	1
Undulant fever:	
Hawaii Territory	1
Missouri	6
Vermont	3
Whooping cough:	
Hawaii Territory	51
Mississippi	549
Missouri	187
Vermont	70

March 1936

	Cases
Actinomycosis:	
Iowa	1
Anthrax:	
Nebraska	1
Chicken pox:	
Arkansas	102
Delaware	50
District of Columbia	85
Indiana	263
Iowa	227
Nebraska	119
New Mexico	177

March 1936—Continued

	Cases
Dysentery:	
New Mexico (bacillary)	2
Epidemic encephalitis:	
District of Columbia	1
Iowa	2
German measles:	
Iowa	15
New Mexico	16
Mumps:	
Arkansas	387
Delaware	143
Indiana	372
Iowa	1,062
Nebraska	237
New Mexico	561
Ophthalmia neonatorum:	
New Mexico	1
Paratyphoid fever:	
New Mexico	1
Puerperal septicemia:	
New Mexico	3
Rabies in animals:	
Indiana	62
Septic sore throat:	
Iowa	3
Nebraska	1
New Mexico	9
Trachoma:	
New Mexico	1
Undulant fever:	
Iowa	4
Whooping cough:	
Arkansas	22
Delaware	27
District of Columbia	44
Indiana	162
Iowa	58
Nebraska	55
New Mexico	43

PLAGUE-INFECTED GROUND SQUIRREL IN VENTURA COUNTY, CALIF.

The Director of Public Health of California has reported that plague infection has been proved in a ground squirrel received at the laboratory on March 28, 1936. This squirrel was found south of Camarillo in Ventura County.

WEEKLY REPORTS FROM CITIES

City reports for week ended Mar. 28, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross-section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	2	1	1	0	0	0	1	17
New Hampshire:											
Concord	0	------	0	0	0	0	0	2	0	0	9
Manchester	0	------	0	0	0	0	0	1	0	0	16
Nashua	0	------	------	2	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	48	0	0	0	0	0	1	8
Rutland	0	------	0	131	1	0	0	0	0	0	5
Massachusetts:											
Boston	6	------	1	380	40	63	0	18	1	27	256
Fall River	0	------	1	3	2	12	0	1	0	1	35
Springfield	0	------	0	2	1	15	0	1	1	12	48
Worcester	0	------	0	2	6	18	0	1	0	10	55
Rhode Island:											
Pawtucket	------	------	------	------	------	------	------	------	------	------	------
Providence	0	------	1	40	9	21	0	2	0	3	66
Connecticut:											
Bridgeport	0	------	0	4	5	4	0	1	0	3	31
Hartford	0	------	0	5	7	6	0	2	0	0	61
New Haven	1	1	0	0	6	1	0	1	0	70	56
New York:											
Buffalo	1	------	0	29	19	71	0	12	0	10	161
New York	80	22	14	2,093	188	459	0	110	5	75	1,705
Rochester	0	------	3	0	7	2	0	1	0	0	91
Syracuse	0	------	1	59	4	13	0	0	0	8	47
New Jersey:											
Camden	0	2	1	0	6	4	0	2	0	2	34
Newark	0	6	1	8	17	191	0	11	0	20	137
Trenton	0	------	0	1	10	8	0	2	0	19	45
Pennsylvania:											
Philadelphia	5	14	12	531	61	64	0	22	2	54	576
Pittsburgh	3	6	5	38	51	128	0	7	0	20	253
Reading	0	------	0	2	2	3	0	1	0	1	36
Scranton	0	------	------	0	------	3	0	------	0	0	------
Ohio:											
Cincinnati	11	------	2	17	24	13	0	10	0	2	180
Cleveland	1	125	5	53	44	72	0	17	1	83	258
Columbus	5	4	4	0	11	13	0	3	1	3	110
Toledo	1	------	0	49	6	2	0	9	0	9	86
Indiana:											
Anderson	1	------	1	0	2	7	0	0	0	6	15
Fort Wayne	3	------	2	0	8	9	0	0	0	0	32
Indianapolis	2	------	2	2	26	41	0	5	0	15	129
Muncie	1	------	0	0	1	1	0	0	0	0	9
South Bend	0	------	0	0	2	9	0	0	0	14	16
Terre Haute	1	------	0	0	0	8	0	0	0	0	25
Illinois:											
Alton	1	------	0	0	1	1	0	1	0	1	6
Chicago	17	17	13	17	80	283	0	41	1	193	795
Elgin	0	------	0	0	2	4	0	0	0	3	10
Moline	0	------	0	0	2	6	0	0	1	1	17
Springfield	1	------	1	0	3	21	0	0	0	0	26
Michigan:											
Detroit	3	12	7	30	58	138	1	23	2	178	389
Flint	0	------	0	0	0	11	0	2	0	26	34
Grand Rapids	0	------	2	10	2	12	0	2	0	8	33
Wisconsin:											
Kenosha	0	------	0	1	0	7	0	0	0	4	6
Madison	0	------	0	1	0	14	0	2	0	4	23
Milwaukee	0	2	2	2	6	95	0	4	0	79	106
Racine	0	------	0	------	1	21	0	2	0	3	15
Superior	0	------	0	0	2	24	0	0	0	1	10
Minnesota:											
Duluth	0	------	0	0	2	5	0	0	0	3	31
Minneapolis	2	------	2	209	19	149	0	0	0	11	129
St. Paul	0	------	0	135	7	57	0	1	1	4	70
Iowa:											
Cedar Rapids	0	------	------	0	------	5	1	------	0	4	------
Davenport	0	------	------	0	------	10	0	------	0	0	------
Des Moines	0	------	------	0	------	11	0	------	0	0	47
Sioux City	0	------	------	0	------	14	18	------	0	0	------
Waterloo	0	------	------	0	------	7	0	------	0	1	------

City reports for week ended Mar. 28, 1936—**Continued**

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Missouri:											
Kansas City	7		14	3	38	33	0	6	0	3	156
St. Joseph	0		4	0	13	5	0	3	0	0	69
St. Louis	10	8	1	2	23	72	0	8	0	9	267
North Dakota:											
Fargo	0		0	1	0	5	1	0	0	0	10
Grand Forks	0			0		1	0		0	0	
Minot	0		0	0	0	4	0	0	0	0	3
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0			0		19	8		0	0	
Nebraska:											
Omaha	4		1	5	13	127	11	1	0	0	76
Kansas:											
Lawrence	0	9	0	0	3	3	0	1	0	0	12
Wichita	1		0	1	5	18	0	0	0	1	28
Delaware:											
Wilmington	0		0	0	5	0	0	1	0	2	25
Maryland:											
Baltimore	1	29	6	110	37	39	0	19	1	27	251
Cumberland	1			0		3	0		0	0	
Frederick	0		0	0	1	0	0	0	0	0	3
Dist. of Columbia:											
Washington	14	4	3	46	25	21	0	8	0	13	212
Virginia:											
Lynchburg	0		0	1	3	1	0	0	0	14	14
Norfolk	0		0	0	9	2	0	0	0	4	35
Richmond	2		2	3	2	28	0	1	0	0	52
Roanoke	0		1	0	6	5	0	1	0	0	22
West Virginia:											
Charleston	0	13	1	0	1	0	0	1	0	0	9
Huntington	0	0		0		1	0		0	0	
Wheeling	0		1	20	4	1	0	1	0	0	[illegible]
North Carolina:											
Gastonia	0		1	0	1	1	0	0	0	0	8
Raleigh											
Wilmington	0		0	0	2	0	0	0	0	0	8
Winston-Salem	1		0	122	2	2	0	1	0	0	9
South Carolina:											
Charleston	0	60	2	0	6	4	0	2	0	5	34
Columbia											
Florence	1		0	0	3	0	0	0	0	0	13
Greenville	0		0	13	2	0	0	0	0	0	20
Georgia:											
Atlanta	4	26	4	1	7	11	0	5	0	0	107
Brunswick	0		0	0	2	0	0	1	0	0	7
Savannah	2	13	2	0	3	3	0	3	0	0	42
Florida:											
Miami	0	9	3	3	3	1	0	4	1	2	49
Tampa	0	4	3	1	3	2	0	4	0	0	39
Kentucky:											
Ashland	1		0	0	0	0	0	0	0	1	
Covington	0		0	4	3	4	0	0	0	0	22
Lexington	0		0	0	6	0	0	2	0	1	21
Louisville	2	40	3	8	15	26	0	3	0	6	92
Tennessee:											
Knoxville	2		2	36	3	2	0	1	1	0	32
Memphis	1		10	2	27	14	0	12	0	6	143
Nashville	0		6	1	11	8	0	5	1	0	74
Alabama:											
Birmingham	0	89	12	0	25	3	0	4	1	0	118
Mobile	0	11	4	1	3	0	0	1	0	0	26
Montgomery	0	7		2		2	0		0	1	
Arkansas:											
Fort Smith	1			0		0	0		0	0	
Little Rock	2		0	1	10	2	0		0	0	10
Louisiana:											
Lake Charles	0		1	0	2	0	0	0	0	0	6
New Orleans	2	80	24	26	37	9	0	15	0	80	223
Shreveport	0		0	17	15	2	0	4	0	0	58
Oklahoma:											
Oklahoma City	1	26	0	0	18	6	0	0	0	2	54
Texas:											
Dallas	3	2	2	57	9	3	0	6	0	2	75
Fort Worth	1		1	0	10	9	0	6	0	0	65
Galveston	2		0	16	6	3	0	0	0	0	18
Houston	7		6	8	28	1	0	6	0	0	129
San Antonio	2		8	9	8	2	0	5	0	0	65

City reports for week ended Mar. 28, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	0	------	0	0	0	8	0	1	0	4	6
Great Falls	0	------	0	0	1	5	0	0	1	4	8
Helena	0	------	0	0	0	0	0	0	0	0	5
Missoula	0	------	0	0	0	10	0	0	0	0	3
Idaho:											
Boise	0	------	0	26	0	4	0	0	0	0	7
Colorado:											
Colorado Springs	0	------	0	0	2	8	0	8	0	4	12
Denver	8	------	0	8	10	14	0	3	0	18	100
Pueblo	0	------	0	0	0	33	0	1	0	7	6
New Mexico:											
Albuquerque	0	2	1	0	1	16	1	2	0	1	16
Utah:											
Salt Lake City	0	------	0	8	6	65	4	4	0	1	40
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	2	157	4	15	1	6	0	6	107
Spokane	0	4	4	4	0	14	0	1	0	4	35
Tacoma	0	------	0	19	9	6	0	0	0	0	40
Oregon:											
Portland	1	7	5	99	15	8	0	1	0	1	104
Salem	0	28	------	7	------	1	1	------	0	1	------
California:											
Los Angeles	5	52	4	612	9	55	0	18	0	28	280
Sacramento	2	2	1	12	3	2	0	0	0	10	20
San Francisco	1	4	0	410	6	82	0	4	0	34	138

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	3	5	0
Springfield	1	0	0
Rhode Island:			
Providence	2	1	0
Connecticut:			
New Haven	2	0	0
New York:			
New York	35	7	0
New Jersey:			
Newark	2	0	0
Pennsylvania:			
Philadelphia	5	2	0
Pittsburgh	1	1	0
Ohio:			
Cincinnati	5	0	0
Cleveland	3	1	0
Columbus	1	1	0
Indiana:			
Indianapolis	1	0	0
Illinois:			
Chicago	8	2	0
Michigan:			
Detroit	1	4	0
Minnesota:			
Duluth	1	0	0
Iowa:			
Des Moines	2	0	0
Missouri:			
St. Joseph	2	2	0
Nebraska:			
Omaha	0	1	1
Maryland:			
Baltimore	13	10	0
District of Columbia:			
Washington	10	4	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Virginia:			
Richmond	2	0	0
Roanoke	1	1	0
South Carolina:			
Winston-Salem	1	0	0
Charleston	14	2	0
Greenville	0	1	0
Georgia.			
Atlanta	4	1	0
Savannah	1	1	0
Florida:			
Tampa	1	2	0
Kentucky.			
Covington	3	2	0
Louisville	2	0	0
Tennessee:			
Knoxville	0	1	0
Memphis	1	1	0
Alabama:			
Birmingham	1	0	0
Arkansas:			
Fort Smith	1	0	0
Louisiana:			
New Orleans	2	0	0
Oklahoma:			
Oklahoma City	1	0	0
Texas:			
Galveston	1	1	0
Houston	4	4	0
San Antonio	1	0	0
California:			
Los Angeles	4	0	1
San Francisco	1	0	0

Epidemic encephalitis.—Cases: Boston, 1; Philadelphia, 1; Denver, 1.
Pellagra.—Cases: Atlanta, 2; Savannah, 1; Dallas, 1; Albuquerque, 1: Los Angeles, 6; San Francisco, 1.
Typhus fever.—Cases: Galveston, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended March 21, 1936.—During the 2 weeks ended March 21, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					6				2	8
Chicken pox		19	15	216	460	26	73	25	109	943
Diphtheria	1	4	2	43	14	12	3	8	5	87
Dysentery				3	2					5
Erysipelas				9	7	4	5		4	29
Influenza		21	1		192	36	81		669	1,000
Lethargic encephalitis					1					1
Measles		72	7	4,170	7,417	935	1,321	175	1,644	15,741
Mumps		7			1,138	81	185	73	252	1,736
Paratyphoid fever					1					1
Pneumonia		1			90				24	115
Poliomyelitis				2						2
Scarlet fever	1	36	7	190	635	89	25	76	60	1,119
Smallpox								22		22
Trachoma						2			4	6
Tuberculosis	6	3	19	126	67	31	1	4	22	279
Typhoid fever	1		4	31	4	7	4	1	2	54
Undulant fever				1	8					9
Whooping cough		40	16	81	452	54	45	23	83	794

JAMAICA

Communicable diseases—4 weeks ended March 21, 1936.—During the 4 weeks ended March 21, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis	2	3	Puerperal fever		1
Chicken pox	3	50	Scarlet fever		1
Dysentery	12	5	Tuberculosis	42	117
Leprosy	1	10	Typhoid fever	11	150

JAPAN

Infectious diseases—1933–34.—During the years 1933 and 1934, certain infectious diseases were reported in Japan as follows:

Disease	1933		1934	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	359	219	1,191	650
Cholera	628			
Diphtheria	28,518	5,270	30,110	5,089
Dysentery	38,051	14,220	42,942	14,771
Scarlet fever	12,028	406	16,691	509
Smallpox	375	56	323	36
Typhoid fever	38,518	7,229	42,605	7,732

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for March 27, 1936, pages 349–361. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued April 24, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

Ceylon.—According to information dated April 7, 1936, 22 cases of cholera were reported among workers in rice fields near Batticaloa, Ceylon. The first case was reported on April 4.

Plague

Peru.—Two cases of plague, with two deaths, were reported in Callao, Peru, during February 1936.

United States—California.—A report of a plague-infected ground squirrel in Ventura County, Calif., appears in this issue of the PUBLIC HEALTH REPORTS, page 486.

Smallpox

Japan—Osaka.—During the week ended March 21, 1936, 5 imported cases of smallpox were reported in Osaka, Japan.

Yellow Fever

Gold Coast—Kumasi.—During the week ended March 28, 1936, one case of yellow fever was reported in Kumasi, Gold Coast.

Ivory Coast—Vavua.—During the week ended April 4, 1936, one case of yellow fever, with one death, was reported in Vavua, Ivory Coast.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen R C WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law. United States Code, title 42, sections 7, 30, 39; title 44, section 220

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

VOL. 51 APRIL 24, 1936 NO. 17

AN OCCUPATIONAL DERMATITIS DUE TO HEAT DECOMPOSITION OF DYES[1]

By LOUIS SCHWARTZ, *Senior Surgeon, United States Public Health Service,* and C. D. HOCKER, Ph. D., *Plant Materials Engineer, Bell Telephone Laboratories*

In January 1932, a telephone-cable splicer in New York developed a case of dermatitis on his wrists and forearms. The rash cleared up promptly; and since no such skin irritation had occurred to splicers in all the history of cable splicing, embracing a period of approximately 40 years, its cause was not ascribed to the workman's occupation. By the end of August 1932, 6 splicers out of a total of some 150 in New York had experienced temporary affections of a rash of the same appearance. By that time the belief was entertained that the rash was probably occupational, although there had been no report of its occurrence among telephone-cable splicers doing the same kind of work in other cities of the United States. However, three or four of the affected workmen in New York were observed to contract recurring cases. Their rash came back on return to splicing work after prior affections had cleared up during the period of a few days when the men were not engaged in their regular occupations.

In 1933, five splicers out of a total of about 75 in Chicago experienced cases of rash apparently of the same nature as those observed in New York. Also, just as in the case of the New York workmen, the dermatitis of the Chicago splicers cleared up promptly when the men were taken off the job.

Descriptions of the rash occurring in the two cities indicated that it was the same form of skin irritation—a *dermatitis venenata* caused by an external irritant.

During 1933, additional cases appeared in New York. By the end of 1933 the number of cases which had been reported in both New York and Chicago totaled 35, occurring among 21 workmen. No cases had been reported from any other city in the United States; also, no cases of the dermatitis had been reported from any ..tion since the end of 1933.

Even though there was reason to believe that this dermatitis did not appear to have any serious effect on the splicers, and its occur-

[1] Submitted for publication Aug. 19, 1935.

rence might be almost entirely avoided by shifting [illegible] workmen to other employment, it was considered important to find the cause of the trouble and take the steps necessary to avoid it.

THE OPERATIONS OF CABLE SPLICING

Cables can be spliced only after they are placed in position in the location where they are to do service. Consequently, splicers may do their work in underground manholes, inside of buildings, or outdoors where cables are installed by suspension. The work is done entirely by men working in pairs—a splicer and a helper.

Two sections of a cable to be spliced together are placed so that their ends overlap (about 1½ to 2½ feet, depending on the size of the cable). The main operations of splicing are as follows:

I.—Cutting off the moisture-excluding lead sheath from the ends of the overlapped cable.

IIA.—*The mechanical operations* of splicing the wires of one cable section to those of the other. These involve the following:

1. Impregnating the paper-insulated conductors by pouring over them a hot wax or wax-oil mixture as described in detail in IIB, below.

2. Separating the assembly of insulated wires into definite groups, according to a plan for splicing selected wires of one cable section to the right wires of the other. To facilitate the selection of the right wires, the conductors in a cable are arranged in groups, about half of them having their paper-insulating coverings dyed. Three colors are used—red, green, and blue.

3. Removing the paper insulation from the ends of two wires (one from each cable) and twisting the bared ends together; repeating this operation until all the wires of one section are joined to the right wires in the other.

4. Putting an insulating covering over each individual wire joint as soon as it is made. This consists of sliding a paraffin-impregnated cotton sleeve over each wire joint, the sleeve having previously been slipped over the free end of one wire before starting to make the twisted joint.

4. Compacting all of the spliced wires into a cylindrical bundle by means of a spiral wrapping of paraffin-impregnated strip muslin.

IIB. *The "boiling out" operations.*—The purpose of these operations is to get rid of the moisture in the insulated conductors, and to impregnate these conductors to minimize absorption of moisture during the period of time that the lead sheath is removed.

Boiling out consists of pouring hot melted paraffin (or paraffin-oil mixture) over the insulated conductors. The paraffin, heated to nearly 400° F., is ladled over the conductors, the wax that runs off being caught in a drip pan and saved for subsequent repeated use.

Cables that are being spliced are boiled out as soon as their lead sheaths have been removed and the bundles of wires inside loosened. After the wires have all been spliced, a cable is again boiled out at the time that the compacting muslin wrapping is applied. Between this initial and final treatment the cable may be boiled out once, twice, or even several times if it is a large cable which has to be left unsheathed for a considerable period of time to complete joining the conductors. Thus, an 1,800-pair cable may be open as long as 3 days and be boiled out a dozen times, particularly if the atmosphere is humid.

III. *Restoring a moisture-excluding lead covering.*—This is done by sliding a lead sleeve over the bundle of joined wires, beating down the sleeve at its ends until it approximately touches the lead sheath, and soldering the ends to the sheath by wiping a joint with solder. Of course the lead sleeve is slipped over one of the free ends of the cable before the wire-splicing operations are started.

EVIDENCES AND EARLY WORK ON THE CAUSES OF THE RASH

All cases of rash reported had been contracted by splicers working on a particular type of cable—1,800-pair "pulp insulated" cable. This type of cable, first introduced in the telephone plant in 1929, was coming to be handled to a considerable extent by splicers at the time of the incidence of the dermatitis. The use of this cable involved the handling of two materials new to splicers—"pulp insulated" conductors and "splicing oil." No other changes in materials or in technique of cable splicing had been introduced for many years previously.

Pulp insulation is a tube of wood-pulp fibers felted directly onto cable conductors. Its use has partly supplanted that of strip-paper insulation which has been employed for upwards of 40 years. Strip insulation is a spiralled wrapping of thin paper tape made from a mixture of old Manila rope fibers and wood pulp.

Pulp-insulated conductors differ ostensibly from strip-insulated ones only in the nature of the paper fibers and the method of applying the insulation. Even the three dyes used as identifying coloring of the pulp insulation are nearly the same as those used in strip paper. The red and green dyes are identical—fuchsine and malachite-green respectively, and the blue dyes are chemically similar—methyl violet for the strip paper, and crystal violet for the pulp insulation.

Splicing oil is a highly refined white mineral oil similar to the white oils taken internally. It came into use in cable-splicing work shortly after the introduction of pulp insulation. The pulp insulation was found to be difficult to handle and remove, particularly in cold weather, unless boiled out with some material softer than paraffin. Consequently, splicing oil is furnished for the workmen to add to paraffin in the proportions needed for their work.

Pulp insulation and splicing oil were the logical materials to be suspected as causing the rash, but there was certain contradictory evidence. First, no cases of rash had ever been reported in the splicing of 1,200-pair, 900-pair, or smaller sized pulp-insulated cables. All cases had occurred as a result of splicing the largest size (1,800-pair) cable, although the materials handled by the workmen and the technique of their operations are the same for all sizes of pulp-insulated cable. Second, no cases of rash had ever been reported from splicing strip-insulated cable of any size, although a little oil is sometimes added to the boiling-out compound in working on strip-insulated cables. Third, discussion with the medical officers of the

paper-pulp supplier disclosed that no dermatitis had ever developed among workmen in their factory traceable to the handling of the pulp. Finally, the splicing oil, which is a highly refined material, was being used in other industries and had caused no dermatitis as far as could be ascertained.

In the early stages of the investigation many patch tests were made at one time or another by the medical staffs of the New York Telephone Co., the Illinois Bell Telephone Co., and later by the American Telephone & Telegraph Co. A recapitulation shows that a total of about 220 individual patches were applied, partly to splicers who had experienced the rash and were willing to be patch-tested, and partly to other men who volunteered to take part in the experiments. The materials used included the following:

1. New paraffin.
2. New splicing oil.
3. Mixture of new paraffin and new splicing oil.
4. New paraffin which had been repeatedly heated.
5. New splicing oil which had been repeatedly heated.
6. Mixture of new paraffin and new splicing oil which had been repeatedly heated.
7. Mixture of paraffin and splicing oil taken from compound repeatedly used in the field.
8. Ground-up strip paper.
9. Dust shaken out of pulp-insulated cable.
10. Dust shaken out of undyed pulp insulation.
11. Green dyed pulp insulation.
12. Red dyed pulp insulation.
13. Blue dyed pulp insulation.
14. Green dye.
15. Red dye.
16. Blue dye.

Skin irritations or reactions (mostly slight ones) were obtained for about 10 percent of the patches applied. No one material consistently produced a reaction either on rash-susceptible splicers or on other men patch-tested.

Viewing collectively the results of the mentioned patch tests, the findings were so inconsistent that they afforded no trustworthy indication of the cause of the rash. Later findings explained why patch tests alone could not determine the cause of the dermatitis.

Early in the investigation, dyes in the pulp insulation were suspected as possible causes of the skin disorder. Consultation with certain dye manufacturers brought out that they had observed no dermatitis among their workmen due to the handling of these dyes, but they would suspect certain of the intermediates used in the preparation of the dyes, such as dimethyl aniline and Michler's hydrol. There was a possibility that the heat treatment received by the cable in boiling out would decompose the dyes to produce these intermediates.

Laboratory experiments did show that the dyed pulp insulation was dulled in color by the boiling-out operation, which possibly indicated some decomposition of the dyes. It was also found that any of the triphenyl methane dyes used in a cable would decompose when heated with splicing oil at 400° F., the destruction being more rapid if a little moisture was present. In these laboratory tests, aniline was shown to be a decomposition product of fuchsin, and dimethyl aniline to be a product obtained from the heating of malachite-green and crystal violet. Also, traces of dimethyl aniline were found in a mixture of paraffin and oil which had been used repeatedly in the field for boiling out pulp-insulated cable.

PLAN OF THE PRESENT INVESTIGATION

In view of the indecisive results obtained from the early work outlined above, the course which seemed most promising for further prosecution of the investigation was that of observing splicers occupationally engaged. It was planned that some, if not all, of the splicers taking part in the test should be men known from plant experience to be susceptible to contracting rash, provided the men gave their free consent to take part in this work.

In leading up to a systematic plan, engineers of Bell Telephone Laboratories consulted a number of experts in industrial hygiene, and, as a result, the advice and cooperation of the Public Health Service were obtained in the planning and conduct of the study.

A plan of study was formulated in which the workmen would splice cables substantially in accordance with their regular technique, but would handle only selected materials in each experiment. The main outline of this plan involved carefully observing susceptible workmen to note any appearance of rash in the following successive experiments:

1. Splicing undyed pulp-insulated conductors with no boiling-out treatment.
2. Splicing undyed pulp-insulated conductors boiled out with a 50–50 paraffin-oil mixture.
3. Splicing red-dyed pulp-insulated conductors boiled out with a 50–50 paraffin-oil mixture.
4. Splicing green-dyed pulp-insulated conductors boiled out with a 50–50 paraffin-oil mixture.
5. Splicing blue-dyed pulp-insulated conductors boiled out with a 50–50 paraffin-oil mixture.
6. An intensification of experiments (3), (4), and (5) provided by adding a little red, green, or blue dye to the boiling-out compound.[3]
7. Conducting such patch tests as might appear warranted to check observations of the occurrence of rash on the susceptible workmen taking part in the splicing tests.

[3] Because the men in actual work repeatedly use the same boiling-out compound, which has in it an accumulation of dyes dissolved out of the cables.

This plan of work was carried out substantially as conceived but with later additions of certain tests suggested by the results of the experiments as outlined.

Chicago was chosen as the place for conducting the planned splicing tests because of the availability in that city of several splicers who had contracted rash previously. The tests were conducted indoors in space made available in a shop of the Illinois Bell Telephone Co. An arrangement was made for the men to work from Monday to Thursday of each week, and then be off the job until the following Monday.

In any experiment the set-up of wires to be spliced (1,200 pairs of the same color) and the boiling-out materials to be used were prepared ahead of time by the test supervisor. Each splicer was instructed not to touch any wires, splicing tools, or materials, except those assigned to him. At the start of the test series, each splicer was provided with a new shirt, overalls, and tools. The man's name was painted on each piece of his equipment.

In any experiment in which boiling out was involved, this operation was conducted three times a day. At the end of each week, samples of each used compound were retained for possible subsequent examination. To make sure that the splicers came thoroughly in contact with the fumes from the compound during the boiling-out operation, each man after removing the lid from his pot of heated compound held his hands and arms over the pot for 2 minutes. The cables were then boiled out, during which operation each man held his hands and arms over the pot for an additional 2 minutes. Before each boiling out, the wires were sprayed with a little water to simulate the absorption of moisture by an open cable in humid atmosphere. This was done because it was found in previous laboratory tests that the dyes decompose more readily in the presence of moisture than when no water is present.

The splicing experiments were started on July 16, 1934. The seven splicers who had previously experienced the rash expressed their willingness to take part in the study. All of these men were given a very careful physical examination, the results of which are shown in detail in the appendix to this report. None of the seven splicers was found to be entirely free from some form of the skin disorders often detected in a careful physical examination of a group of people.

Each workman was carefully watched for any appearance of rash while at work. As soon as any man developed any indication of dermatitis, he was examined by the Illinois Bell Telephone Co.'s physician cooperating in the study. If the case was definitely identifiable as rash, the man was excused from work until it had cleared up. If the case was uncertain, he was returned to the job for observation of further developments.

The severity of cases of rash contracted during the splicing tests was graded in the following manner:

Severity	*Symptoms*
(?)	Erythema so slight as to be confused with that caused by exposure to heat or wind, or so localized as to be doubtful. Usually accompanied by some itching.
1+	Persistent erythema over definite areas accompanied by a drawing sensation of the skin.
2+	More definite erythema with small areas of oedema accompanied by a burning sensation of the skin.
3+	Symptoms of one and two more advanced and usually showing beginning papular elevations.
4+	Brilliant erythema over large areas with considerable oedema and small watery blisters accompanied by intense itching and burning of the affected skin.

PLANNED SPLICING TESTS AND RESULTING EVIDENCE ON THE CAUSES OF RASH

The planned cable-splicing tests were conducted for 14 weeks. During 8 of these weeks, seven splicers were working; during the other 6 weeks fewer than seven men were available, because of vacations or other considerations. The following tabulation lists chronologically the splicers who were at work each week, the materials which they handled in their work, and the observations on the cases of dermatitis developed.

Cable-splicing operations and results

[Key to abbreviations: P=paraffin; P-O=50-50 mixture of paraffin and splicing oil; 1+, 2+, 3+, 4+=cases of rash of increasing severity]

Splicers	Materials handled			Results and remarks
	Color of insulation	Boiling-out compound (B. O.)	Dye added to boiling-out compound	
First week				
A, B, D, and F	None	None	None	No reaction.
Second week				
A, B, and F	do	P-O	do	Do.
G	do	None	do	Do.
Third week				
F	Red	P-O	do	Do.
G	None	do	do	Do.
Fourth week				
F	Green	do	do	Do.
A and G	Red	do	do	Do.
C, D, and E	None	do	do	No reaction. Supervisor got case of rash on Thursday while preparing material for next week's experiment.
Fifth week				
F	Blue	do	do	No reaction.
A and G	Green	do	do	Complained of itching on Thursday.
B, C, D, and E	Red	do	do	No reaction.

Cable-splicing operations and results—Continued

[Key to abbreviations: P=paraffin; P-O=50-50 mixture of paraffin and splicing oil; 1+, 2+, 3+, 4+=cases of rash of increasing severity]

Splicers	Materials handled			Results and remarks
	Color of insulation	Boiling-out compound (B. O.)	Dye added to boiling-out compound	
Sixth week				
F	Red	P-O	Red	No reaction.
A and G	Blue	do	do	Do.
B, C, D, and E	Green	do	do	Do.
Seventh week				
F	do	do	Green	Do.
G	Red	do	Red	Do.
B, C, D, and E	Blue	do	None	D complained of itching on Wednesday.
Eighth week				
F	do	do	Blue	4+ on Thursday.
G	Green	do	Green	4+ on Tuesday.
A, B, C, D, and E	Red	do	Red	C, 4+ on Wednesday. B, 2+ on Thursday. A, complained of itching. Cases A, B, and C were proved by experiments in 11th week to be false indications.
Ninth week				
F and G	None	do	None	Worked in other room than that used by other splicers. No reaction.
A, B, C, D, and E	Green	do	Green	A, 2+ on Monday. B, 4+ on Monday. C, 3+ on Tuesday. D, questionable reaction on Monday. E, 4+ on Tuesday. Dr. B, 4+ on Monday. Did not handle splices. Supervisor, 2+ on Monday. Did not handle splices.
Tenth week				
A, B, C, D, E, and G	Blue	do	Blue	A, questionable reaction on Tuesday. B, 4+ on Tuesday. C, 3+ on Tuesday. D, Faintly positive on Tuesday. E, 1+ on Tuesday. G, 4+ on Tuesday. Dr. B, faintly positive on Monday.
Eleventh week				
B, C, E, F, and G	Red	do	Red	Check test on 8th week. No reactions. Patch tests performed this week.
Twelfth week				
B, E, F, and G	(1)			
Thirteenth week				
B, C, F, G, and 3 other splicers.	(1)			
Fourteenth week				
B, C, and G	Green	P	Green	No reaction.
F	Blue	P	Blue	Complained of itching. No reaction evident.

1 Splicing operations involving new dyes described later.

The following evidence on the possible cause of the rash was brought out by the results of the tests listed in the table.

1. No skin affections were developed from handling undyed pulp insulation, dry or boiled-out with paraffin-oil mixture (first to fourth weeks, inclusive).

2. No definitely identifiable skin reactions developed from handling red-, green-, or blue-dyed pulp insulation boiled out with paraffin-oil mixture (third to seventh weeks, inclusive). However, out of the seven men employed, two complained of itching while working on the green-dyed wires (fifth week), and one had the same experience while working on the blue-dyed wires (seventh week).

3. When a little green or blue dye was added to the boiling-out compound, nearly all the splicers became affected with dermatitis (seventh to tenth weeks, inclusive).

Also in the first tests in which a little red dye was added to the paraffin-oil mixture, two cases of dermatitis developed among five men (eighth week). However, it was suspected that the reactions of these two men might not be due to the red dye but to fumes from the boiling-out operations of other splicers working nearby in the same room with boiling compounds containing added green or blue dyes. A check test made during the eleventh week showed that the red dye did not cause the rash.

The amount of dye added to the boiling-out compound was small, 1½ to 4 gm (depending on the dye) to 10 quarts of the paraffin-oil mixture. These small quantities of dye were amounts calculated in the following manner: When an 1,800-pair cable is spliced, as much as 5 feet of insulated conductors may be unsheathed and boiled out. The dye used to color the red insulation in this 5-foot length is about 0.15 gm. Ten times this quantity is 1.5 gm—the amount of fuchsin added to the boiling-out mixture in experiments involving red dye additions. Similar calculations for the blue and green dyes fix the corresponding amounts used at figures up to about 4 gm.

4. Men who contracted the rash while working with green or blue dyes added to boiling-out compounds one week had no recurrence of the rash the next week while working on undyed wires boiled out with a paraffin-oil mixture containing no added dyes (eighth and ninth weeks).

5. Men who contracted pronounced cases of rash while working with green or blue dyes added to 50–50 paraffin-oil boiling out compound did not contract the rash in a similar test in which the boiling-out compound used was paraffin containing no oil (fourteenth week).

6. The production of the rash is apparently due to an effect of fumes rather than to direct handling of boiled-out cable conductors. Throughout all the experiments the skin reactions which appeared on splicers were generally noted just after a boiling-out operation. Also, at least two cases of rash were produced on men present as observers who had not been handling the cable conductors or other materials (ninth and tenth weeks).

A general consideration of these observations indicated that the rash was caused by volatile materials arising from the green and blue

dyes during the boiling-out operations, and that these volatile irritants are effective only when splicing oil is present in the boiling-out compound. Possibly the fumes from an oil-paraffin boiling-out mixture carry the irritants to a workman's bare arms and face more effectively than do the fumes of paraffin alone; or possibly the greasy layer of boiling-out compound naturally collecting on a splicer's skin inhibits the action of the irritants more effectively when the layer is entirely paraffin than when it is of paraffin-oil mixture.

PATCH TESTS AND RESULTING EVIDENCE ON THE CAUSES OF THE RASH

Certain additional evidence on the possible causes of the rash were obtained from patch tests performed on the workmen employed in the planned cable-splicing tests.

Splicers B, C, E, F, and G were patch-tested with the four dyes used in pulp insulation; namely, (1) fuchsin (the red paper dye); (2) crystal violet (the blue paper dye); (3) auramine (the yellow constituent of the green paper dye); and (4) malachite-green (the dark green constituent of the green paper dye). The first three of these dyes produced no skin reaction on any of the men. However, the fourth dye, malachite-green, caused a reaction on four out of the five men as outlined in the tabulation presented below. It was known that the malachite-green used in pulp insulation is the form of the dye marketed as a double salt with oxalic acid; and it was surmised that this acid constituent might be the cause of the irritation. Accordingly, splicers B, C, E, F, and G were also patch-tested with a 5 percent solution of oxalic acid as well as with the green dye. The results of these tests are shown in the following table:

Reaction	Subject				
	B	C	E	F	G
Severity of rash contracted with green dye added to the boiling out compound in splicing test	4+	4+	4+	0	4+
Reaction to green dye (24 hrs)	0	0	0	0	0
Reaction to green dye (48 hrs)	2+	3+	2+	2+	1+
Reaction to 5 percent oxalic acid (24 hrs)	2+	0	0	0	0
Reaction to 5 percent oxalic acid (48 hrs)	2+	2+	0	0	2+

While the above-described tests indicate that oxalic acid can be a general irritant when in direct contact with the skin, this material cannot be considered as the only cause, and perhaps not the primary cause, of the rash. The blue dye (crystal violet), which also causes the rash, contains no oxalic acid. However, the acid in the green dye may contribute to its potency in causing the rash. The tabulated results of the planned splicing tests indicate that the green dye produced rash somewhat more readily than did the blue dye. (Compare results of the ninth and tenth weeks.)

Another series of patch tests lent credence to the belief that the rash-producing irritants are volatile substances arising from dyes and not the dyes themselves. This series of tests employed boiling-out materials containing dyes. Wherever possible, the boiling-out materials employed were those actually in use by splicers when they contracted the rash. These materials were 50–50 paraffin-oil mixtures to which had been added (1) the red dye, (2) the green dye (the commercially used dyeing mixture of auramine and malachite-green), (3) the blue dye, and (4) a mixture of (1), (2), and (3). None of these materials produced any skin reaction on any of the men patch-tested, who were splicers B, C, E, F, and G, and three other men who were technical people interested in the study.

In an attempt to identify the rash-producing irritant, patch tests were made on splicers B, C, E, F, and G, using dimethyl aniline and Michler's hydrol. Both materials are intermediates used in the manufacture of the dyes and were suspected as possible irritating decomposition products of the dyes. In fact, laboratory tests had actually identified dimethyl aniline as a product produced by heating either the green or the blue dye. No skin reaction was obtained on any of the five splicers patch-tested with Michler's hydrol or dimethyl aniline.

To sum up, the evidence of patch tests supported the hypothesis that it is not the dyes themselves but some decomposition product of them that produces the rash. However, the suspected decomposition products, Michler's hydrol and dimethyl aniline, did not actually produce skin reactions.

SPLICING TESTS INVOLVING NEW DYES AND THEIR EVIDENCE ON THE CAUSES OF THE RASH

During the twelfth and thirteenth week of the planned cable-splicing studies, certain splicing tests involving new green and blue dyes were performed. These tests resulted not only in a practical selection of cable insulation dyes which would not cause the rash during cable splicing, but also helped to explain why the standard dyes do cause the dermatitis.

The rash-producing possibilities of the new dyes were studied by the same method as that used to test the standard ones; that is by observing rash-susceptible workmen while they spliced pulp-insulated cable using a boiling-out compound to which the new dyes had been added.

The new dyes were chosen to avoid the one peculiarity of chemical constitution common to all the old ones which produced the rash. This was the methyl ($-CH_3$)-to-nitrogen (N) linkages common as atomic groupings in auramine, malachite green, and crystal violet. Fuchsin, which did not cause the rash, does not contain this characteristic atomic grouping.

The new dyes studied were brilliant green, ethyl violet, and fast yellow 4GL. Brilliant green and ethyl violet are respectively identical in chemical constitution with malachite green and methyl violet, except that the new dyes contain ethyl groups ($-C_2H_5$) in the molecules in position where the old dyes contain methyl groups. All four of these are triphenyl methane dyes which are about the only class of coloring materials economically and satisfactorily meeting the requirements of cable fabrication, and having the heat-resisting qualities required by boiling-out operations.

In the interest of shortening the cable-splicing studies involving the new dyes, all of them were tested together instead of separately—that is, all of them were added to the boiling-out compound, instead of being tried out one at a time. Accordingly, the prepared boiling-out mixture contained (1) ethyl violet, (2) brilliant green, (3) fast yellow 4GL, and (4) fuchsin. The total amount of the added dyes was that which would be used commercially to color all the wires in 50 feet of an 1,800-pair pulp-insulated cable. This 50 feet represents about 10 times the maximum length of 1,800-pair cable unsheath for a single splice. This was the same basis as had been employed for calculating dye additions in splicing tests on the standard dyes. However, the total dye additions in these new dye tests were several times as much as had been used in any former test.

Splicers B, E, F, and G worked during the twelfth week of the planned cable-splicing tests with pulp-insulated cable boiled out with a 50–50 paraffin-oil mixture containing all the new dyes in addition to fuchsin. Splicer B developed a doubtful reaction on Thursday, while the other three were unaffected.

Splicers B, C, F, and G, and in addition three new splicers not previously employed in the tests, repeated the tests of the twelfth week during the thirteenth week. No reactions developed.

To sum up, the results of the work on new dyes were the finding of a practical selection of dyes which do not cause a rash during cable splicing. The results also indicate the volatile irritants generated by the old dyes during boiling-out are probably due in some manner to the presence in the old dyes of the methyl groups attached to the nitrogen atoms.

DEDUCTIONS REGARDING THE NATURE OF THE RASH-PRODUCING IRRITANTS

The experimental facts that the volatile irritants producing the rash are generated from malachite green and crystal violet but not from the homologous new dyes, permit certain deductions to be made concerning the chemical nature of the irritants.

It seems reasonable to conclude that the irritants are heat-decomposition products, or decomposition and oxidation products of the methyl or of the dimethyl aniline groups contained in the molecules

of the offending dyes. It is possible that the irritants are small amounts of formaldehyde or formic acid generated during the boiling-out operation by the splitting off and oxidation of the methyl groups attached to the nitrogen atoms. Dimethyl aniline (which has been identified as a decomposition product of the offending dyes) is known to react with moisture at elevated temperatures and in the presence of copper to produce formaldehyde.[3]

The presence of a certain amount of moisture in cable insulation, the copper conductors, and the boiling-out temperature of nearly 400° F. would seem to be favorable to the production of some formaldehyde or formic acid from the offending dyes.

The accompanying chart shows the chemical constitution of the standard and of the new dyes used in these studies of the cause of the rash. This chart is reproduced for its possible interest in the deductions regarding the chemical nature of the rash-producing irritants.

THE PRACTICAL OCCURRENCE AND AVOIDANCE OF THE RASH

The evidence on the causes of the rash as presented in the foregoing makes it possible to explain certain peculiarities concerning the practical occurrence of the dermatitis.

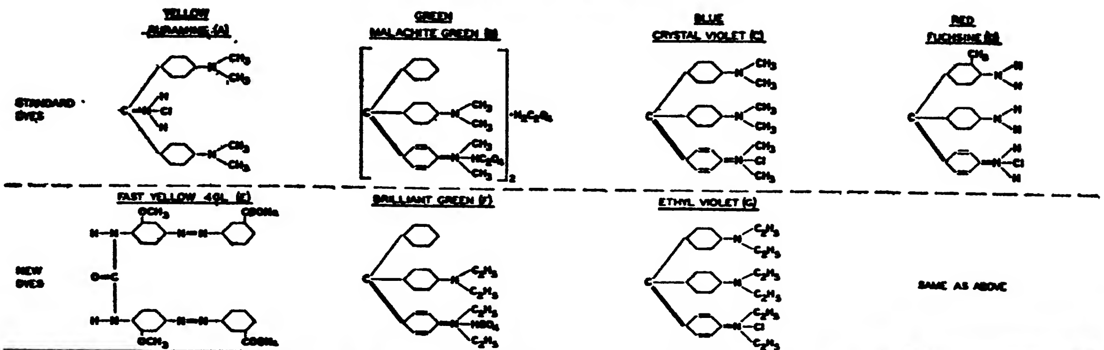
The fact that the irritants are apparently volatile decomposition products produced during boiling-out operations explains why practically all cases of the rash occurred as a result of splicing cables in manholes. In spite of precautions that are taken to ventilate manholes before men enter them and while they are at work, there is less positive air circulation in manholes than in most other locations where cables are spliced.

Probably even a susceptible man cannot contract the rash unless he is exposed to a larger amount of irritants than a certain minimum. This may explain why the dermatitis always occurs as a result of working on large cables. The insulation in small cables may contain insufficient offending dyes to generate the irritants in adequate quantities. The quantitative element of the amount of rash-producing irritants may help to explain the spotty occurrence of the dermatitis. Thus, all the Chicago cases occurred at about the same time, when an unusual amount of cable splicing was being done in certain manholes in one section of the city in preparation for putting a new exchange into service by a certain date. Also, it is possible that repeated reuse of the same boiling-out compound a little longer than normal may permit accumulation in the compound of an adequate amount of offending dye from the cable insulation.

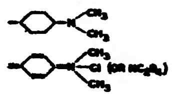
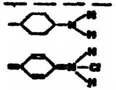
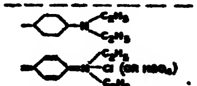
The fact that the dermatitis has not been contracted as a result of working on strip-insulated cable may be due to the practice of using

[3] Trillat, M.: Compte Rendus, 136, 55; and 137, 188; also Bull de la Soc. Chim de France, Series 3, 29, p. 876 and p. 941.

DYES USED IN STUDIES OF THE CAUSES OF RASH



DISTINCTIVE ATOMIC GROUPINGS OF THESE DI- AND TRI-PHENYL METHANE DYES (DOES NOT INCLUDE E)

STRUCTURE	RESEMBLING	OCCURRENCE IN DYES	POSSIBLE DECOMPOSITION PRODUCTS
	DIMETHYL ANILINE	ONLY IN A, B & C, THE RASH PRODUCING DYES	# DIMETHYL ANILINE FORMIC ACID, FORMALDEHYDE } BY SPLIT OF $-CH_3$ GROUP FROM THE AMINE AND ITS OXIDATION MICHLER'S HYDROL OR KETONE
* COOH | COOH	ACTUALLY OXALIC ACID	ONLY IN B, A STRONG RASH PRODUCING DYE.	♦ FORMIC ACID ♦ CARBON MONOXIDE AND DIOXIDE ♦ WATER
	ANILINE	ONLY IN D, NOT A RASH PRODUCING DYE.	# ANILINE
	DIETHYL ANILINE	ONLY IN F & G, NOT RASH PRODUCING DYES.	DIETHYL ANILINE

ACTUALLY FOUND IN LABORATORY TESTS
♦ KNOWN DECOMPOSITION PRODUCTS NOT LOOKED FOR IN LABORATORY TESTS

little or no splicing oil in the boiling-out compound when handling such cables. Also, most of the large-sized cables which have gone into the telephone plant in the last few years have been pulp-insulated.

The practical avoidance of the rash from the handling of pulp-insulated cables manufactured in the future is indicated as achievable by using the selected green and blue dyes for coloring the insulation. This step has been taken. A parallel change of dyes can be made in strip-paper insulation if the need for it becomes evident.

The practical avoidance of the rash from the handling or resplicing of existing pulp-insulated cables in the plant appears to offer no great difficulty now that it is known that the rash-producing irritants are generated only during the boiling-out operation. It seems probable that any significant trouble with this class of work can be avoided by judicious assignment of splicers and by certain precautions of avoiding exposure to fumes during boiling out.

CONCLUSIONS

1. An investigation was conducted which determined the cause of a dermatitis occasionally contracted by certain susceptible telephone cable splicers.

2. The chief method used in the investigation was careful observance of rash-susceptible workmen occupationally engaged in planned cable-splicing tests. Patch tests and chemical studies were used as supplemental methods of investigation.

3. Paper-pulp cable-conductor insulation, suspected as a possible cause of the rash because of its relatively recent introduction into use, was found to be not a cause of the dermatitis.

4. Splicing oil, a refined white mineral oil, also suspected because of its relatively recent adoption, was found to be not a primary cause of the dermatitis. Mixtures of this oil and paraffin heated to nearly 400° F. are used to "boil out" (dry and impregnate) cables while opened for splicing.

5. The dermatitis was found to be produced by some irritant evolved during boiling-out operations.

6. The rash occurred only while splicing cables in which the conductor insulation was colored with the green and blue dyes which had been in use many years. A red dye also normally used did not cause the dermatitis.

7. Contact with the dyes themselves was shown to be not the chief cause of the rash, although a substantial quantity of the green dye applied in a patch test would cause skin reactions.

8. The rash was not produced in cable-splicing tests in which the green and blue dyes were present if paraffin containing no splicing oil was used for boiling out. Apparently the oil is necessary as a

fume carrier or as an agent present on a man's skin to facilitate the action of the volatilized irritants.

9. The volatilized irritants were found not to be certain suspected decomposition products of the dyes. While the irritants were not identified by experiment, their nature was fairly definitely surmised from chemical considerations.

10. New dyes were selected for adoption on the basis of their chemical constitution and adaptability to manufacturing requirements. Splicing experiments with rash-susceptible men showed that the new dyes did not produce rash even when splicing oil was present in the boiling-out compound.

11. It is worthy of note that all of the seven splicers who had dermatitis and who were used in these experiments also had fungus infections on various portions of their bodies (see Case histories). This may be of significance as to their hypersensitivity to the decompostion products of the dyes.

ACKNOWLEDGMENT

The authors wish to give credit to C. F. Bidwell, M. D., of the Illinois Bell Telephone Co., for his active interest and cooperation in observing and making physical examinations of cable splicers working on these tests; to the officers, supervisory staff, and personnel of the Illinois Bell Telephone Co. for facilitating the conduct of the tests; and to Messrs. R. G. Watling and C. C. Lawson of Bell Telephone Laboratories for their personal supervision of the splicing tests and for assistance in the preparation of this report.

Appendix

EXAMINATION OF CABLE SPLICERS BEFORE BEGINNING EXPERIMENTS

Case A.—E. J. B., splicer's helper; complexion, dark; age, 30; service, 10 years. States that he has had the rash on the dorsum of his hands between the fingers, over the arms, face, and legs, and states that the rash was worse when he boiled out with paraffin-oil mixture than when he used paraffin alone. Examination shows a few scratched papules on the forehead and several moles on the face and body; acne lesions on the back of the neck and a few active acne lesions on the back. Forearms and hands are clear, except the left hand, on which there is a scratched ulcer; and he also has a cut on the left thumb. Examination of the feet shows scaling and cracks between the toes. Has a few vesicles on webs of the fingers.

DIAGNOSIS: Dermatophytosis and acne.

Case B.—A. J. D., splicer; complexion, dark; age, 51; service, 22 years. Has had a rash between the fingers and on the wrists and face and thinks he got the rash from contact with the paraffin-oil vapor.

EXAMINATION: Papulo-vesicular eruption under right nipple and scattered vesicles over breast. A few erythematous papules around the spine and the neck. Has scaling and cracks between the toes of both feet, with desquamation

under the instep of the left foot. Has small wax keratoses on both hands and a large wart on the left thumb.

DIAGNOSIS: Dermatophytosis and wax keratoses.

Case C.—R. J., splicer; complexion, dark; age, 38; service, 19½ years. Has had rash on both hands, wrists, arms, and legs, and on face. Thinks that the paraffin-oil mixture is responsible. He states that he worked on one job continuously for 2 weeks before the rash appeared and that it became much worse after he washed with strong soap. The rash disappeared 4 days after he discontinued work and reappeared after he resumed his job.

EXAMINATION: Has tinea versicolor on chest, arms, forearms, and back. Has a discolored mark in the left lumbar region which is probably due to an injury. Also has tinea cruris. No signs of dermatophytosis of the feet. There is a small scar on the left leg above the ankle. Has small keratoses on the dorsum of both hands. Has enlarged thyroid.

DIAGNOSIS: Tinea versicolor, tinea cruris, wax keratoses.

Case D.—E. C., splicer; complexion, dark; age, 50. Has had a rash on both hands and forearms. He worked 3 months on the job before the rash appeared. The rash disappeared after discontinuing work for 3 or 4 days and reappeared when he resumed work. He worked only on smaller cables (2 to 600-pairs of wires) and has not had a recurrence of the rash for 2 years.

EXAMINATION: Has small papilloma on the right forearm and scaling and roughened skin over the posterior surface of the right upper arm. There is a pustule on the left hand near the thumb and an area of desquamation on the posterior surface of the left arm. There is branny desquamation on both legs and thighs, and the skin on the knees is erythematous and thickened. Has scaling of the skin between the toes of both feet and varicose veins on both legs.

DIAGNOSIS: Dermatophytosis; wax keratoses.

Case E.—J. Z., splicer; complexion, blonde; age, 35. Had a rash on hands, wrists, and forearms. He worked for 1 month continuously before the rash appeared. He has had no recurrence of the rash.

EXAMINATION: Has a few scabs on both legs, probably the result of trauma. Has tinea cruris and desquamation and cracks between the toes of both feet.

DIAGNOSIS: Dermatophytosis.

Case F.—J. A., splicer; complexion, dark; age, 37; service, 16 years. Had an eruption on both wrists and forearms which disappeared 4 days after he left the job. He stopped using oil in the boiling-out mixture and has not had a recurrence of the rash for a year.

EXAMINATION: Has a few acne lesions on the back and chest, with some small keloidal scars. Forearms and wrists are clear except for a pigmented mole on the anterior surface of the right wrist. Has cracks and scales between toes of both feet.

DIAGNOSIS: Dermatophytosis and acne.

Case G.—E. S., splicer; complexion, fair; age, 45; service, 22 years. Contracted the rash about 4 days after working with oil and paraffin mixture on new pulp-insulated cable. The rash appeared on both hands and wrists and on the face. He lost 18 days from work as a result of the eruption. This man was not examined on July 16, as he was away on a vacation, but an examination made on August 16 showed the following:

EXAMINATION: Has a deep-seated vesicle on the fourth finger of the right hand near the web and the remains of another vesicle on the middle finger of the left hand. On the dorsal surface of both hands there were a few small keratoses.

DIAGNOSIS: Dermatophytosis (?); wax keratoses.

THE EARLY APPEARANCE AND RATHER RAPID DISAPPEARANCE OF THE EPITHELIAL CELL INCLUSION IN TRACHOMA

By C. E. Rice, *Surgeon, United States Public Health Service*

From March 15, 1935, to February 1, 1936, 96 individuals with varying degrees of lid activity were studied at the Trachoma Hospital at Rolla, Mo., to determine whether the epithelial cell inclusion might be associated with a certain period of the disease. Fifty-one patients had had the disease less than 2 years and 45 had had it 2 years or longer.

In the 96 active trachoma cases, there were 184 infected eyes. A few were unilateral cases of trachoma. Of these 184 actively infected eyes, 49 or 27 percent showed the presence of epithelial inclusions. In the first group of 51 cases under 2 years' duration, 19 showed inclusions. In the second group of 45 cases, with duration of the disease 2 years or longer, there were 8 cases showing inclusions. Among the 51 patients who had had the disease less than 2 years and showing 19 cases with inclusions, 12 were of 3 months' duration or less.

The writer has seen two cases of unilateral trachoma enter the hospital with one eye entirely negative and then develop trachoma in the normal eye while under observation. The inclusions came with the first symptoms of the disease, before the conjunctiva had hardly started to thicken, and certainly long before the follicles were formed. These two cases and three other very early cases seemed to reach an apex, as regards the number of inclusions seen in a smear, in 1 month's time. From then on there was a steady diminution in the number of inclusions until at the end of 6 months only an occasional epithelial inclusion was seen. Two of the cases of 5 years' duration or more, that showed several inclusions in smears made on the first day in the hospital, did not show the presence of inclusions after the first day, even though repeated examinations were made and no therapy was being administered other than drops of water in the conjunctival sac.

The inclusion usually persists for only a few months; and in individuals who have had the disease more than 6 months, the epithelial inclusion is found only occasionally. When found in the cases of long duration, they are few in number and tend to disappear from the conjunctival scrapings in 2 or 3 days when one is taking light scrapings daily.

There is presented graphically in figure 1 the occurrence of the epithelial cell inclusion in different stages of the disease. The first

two columns in this graph and the last column represent fairly accurately the duration of the disease in the individuals placed in these groups. The other columns are only approximations.

CONCLUSIONS

The findings from this group of 96 cases of trachoma with varying degrees of lid activity would seem to indicate that the epithelial cell inclusion seen frequently in this disease is much more likely to

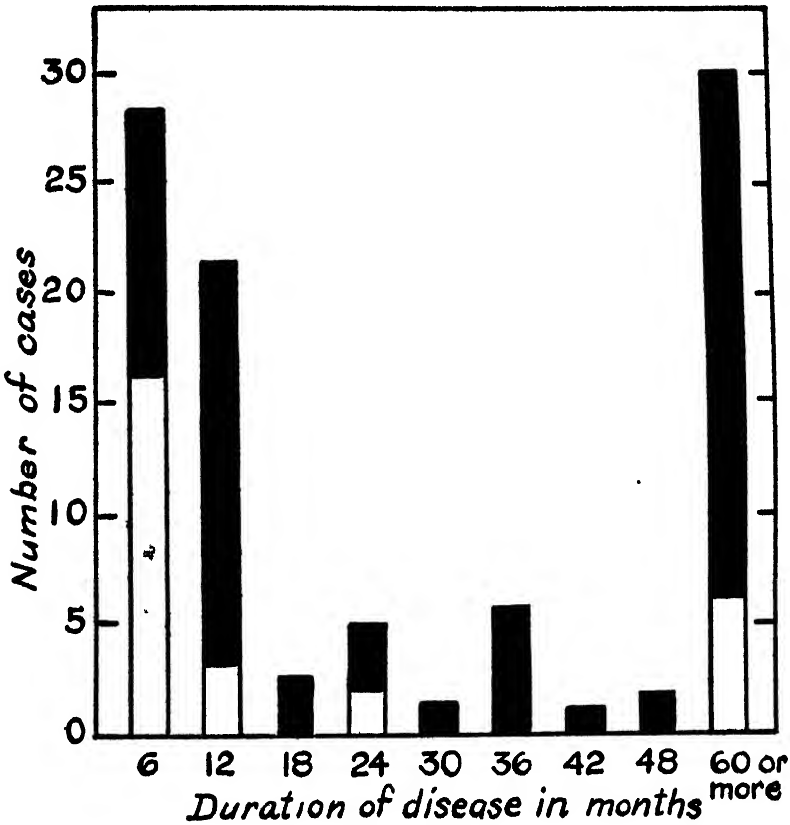


FIGURE 1.

Each column represents the total number of cases in any group. The white portion represents the number of cases showing inclusions. Under "Duration of disease," the first column includes all cases of from 1 day to 6 months' duration, the second column those from 6 months to 1 year. The last column represents cases of 5 years' duration or longer.

be found during the first 6 months of the disease than it is later. The oftener the examination can be done during the first 8 weeks of the disease, the higher will be the percentage of cases showing the presence of the inclusion bodies.

NOTES ON THE OCCURRENCE AND HOST RELATIONSHIPS OF THE TICK *Ornithodoros talaje* IN ARIZONA[1]

By Glen M. Kohls, *Assistant Entomologist*, and R. A. Cooley, *Entomologist*, *United States Public Health Service*

The argasid tick *Ornithodoros talaje* (Guér.-Mén.) is prevalent in Mexico, Central America, and parts of South America. It inflicts bites very painful to man, and in the tropics is an agent in the transmission of relapsing fever (*1*). It has been reported only sporadically in the United States, the first records having been published by Banks (*2*) in 1908 (Citrus County, Fla., Brownsville, Tex., and San Clemente Island, Calif.). Subsequently, Essig (*3*) has listed it from Nevada, and more recently Matheson (*4*), Herrick (*5*), and Riley (*6*), have reported 10 instances of its occurrence in residences and other places of habitation in the States of New York, Wisconsin, and Minnesota, respectively.

Although this tick is credited with a wide host relationship in the tropical and subtropical sections of its range, the United States records are only of locality occurrence and there have been no data as to its natural hosts in our native fauna. What is believed to be the first information concerning the latter was obtained recently by a field group of the Rocky Mountain Laboratory working in Arizona. An account of these observations follows:

On October 2, 1935, larval ticks of this species were collected from kangaroo rats (*Dipodomys* sp.) in the Eagletail Mountains some 40 miles southwest of Aguila, Ariz. Three animals were infested with 21, 16, and 18 ticks, respectively. Six pocket mice (*Perognathus* sp.), one deer mouse (*Peromyscus* sp.), and one wood rat (*Neotoma* sp.) taken in the immediate vicinity carried no ticks. This area is unfrequented except for occasional prospecting parties, the nearest human habitation being about 10 miles distant.

During the period October 8 to 11, 10 systems of kangaroo-rat burrows within 3 miles of Aguila were then examined. No nests were found, but nymphal and adult *talaje* were collected by searching carefully the removed soil. Part of this soil was sifted through an ordinary fly screen. In three instances ticks were found in niches or crevices of earth clods removed from the sides of the passages. The runways were quite extensive, and it is probable that many ticks were undetected. Nevertheless, a total of 79 nymphs and adults were collected, some of which showed evidence of having fed recently. Three larvae were found on one of four kangaroo rats taken on the area, while four jack rabbits and one pocket mouse carried no ticks.

[1] Contribution from the Rocky Mountain Laboratory of the United States Public Health Service, Hamilton, Mont.

Pocket mice are prevalent throughout the region and apparently have no aversion to using deserted kangaroo-rat runways. The fact that ticks were not found on this and other hosts suggests that *O. talaje* may be distinctly limited in its host relationships in this region.

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DEATHS DURING WEEK ENDED APR. 4, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr. 4, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,302	8,615
Deaths per 1,000 population, annual basis	13.0	12.0
Deaths under 1 year of age	623	602
Deaths under 1 year of age per 1,000 estimated live births	56	55
Deaths per 1,000 population, annual basis, first 14 weeks of year	13.7	12.7
Data from industrial insurance companies:		
Policies in force	68,304,318	67,690,404
Number of death claims	14,248	13,806
Death claims per 1,000 policies in force, annual rate	10.9	10.6
Death claims per 1,000 policies, first 14 weeks of year, annual rate	11.0	10.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officer

Reports for Weeks Ended Apr. 11, 1936, and Apr. 13, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 11, 1936, and Apr. 13, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935
New England States:								
Maine		4	19		152	223	1	0
New Hampshire				3	29	7	0	0
Vermont		3			852	11	0	0
Massachusetts	7	7			1,170	530	8	0
Rhode Island	2		3		75	183	3	1
Connecticut	3	5	3	7	91	1,779	4	2
Middle Atlantic States:								
New York	44	29	[1] 14	[1] 5	2,842	2,957	18	9
New Jersey	12	27	9	7	258	1,488	8	0
Pennsylvania	21	49			863	4,816	7	10
East North Central States:								
Ohio	17	46	26	123	237	2,417	18	22
Indiana	16	11	39	30	13	284	2	8
Illinois	30	53	68	85	33	3,017	12	17
Michigan	14	6	11	2	58	5,420	4	0
Wisconsin	3	2	45	60	90	1,733	1	4
West North Central States.								
Minnesota	2	9		3	239	1,230	2	1
Iowa	2	16	11	2	4	679	2	3
Missouri	11	18	680	141		741	9	5
North Dakota	1	3	10	1	1	57	0	0
South Dakota	2	5		1		42	0	0
Nebraska	5	3	1	28	27	587	1	5
Kansas	12	13	133	5	19	1,619	1	2
South Atlantic States:								
Delaware					13	10	0	0
Maryland [3]	2	6	8	9	247	79	20	5
District of Columbia	7	16	1	1	68	50	3	4
Virginia	8	11	414		148	769	16	10
West Virginia	9	17	165	69	61	623	12	2
North Carolina	19	15	50	9	44	253	4	4
South Carolina [3]	4	4	331	221	40	42	5	0
Georgia	8	7	201	55			7	0
Florida	1	9	38	2	14	82	5	0
East South Central States:								
Kentucky	11	14	312	21	39	672	18	7
Tennessee	7	10	745	68	69	82	7	4
Alabama	7	9	1,440	78	18	286	6	3
Mississippi [3]	4	5					3	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 11, 1936, and Apr. 13, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr 11, 1936	Week ended Apr. 13, 1935
West South Central States:								
Arkansas	5	4	568	24	5	75	2	2
Louisiana	4	18	291	117	62	100	2	1
Oklahoma [4]	11	7	236	94	12	259	5	6
Texas	52	36	646	250	483	270	16	7
Mountain States:								
Montana	1	7	121	42	15	439	5	0
Idaho	1		4	4	39	17	1	0
Wyoming	1				2	106	0	0
Colorado	5	5			13	315	4	0
New Mexico	3	8	15	16	35	28	4	1
Arizona	3		110	38	65	21	3	0
Utah [3]					18	12	0	0
Pacific States:								
Washington		1	3	1	378	228	2	2
Oregon [3]		2	98	35	276	232	0	4
California	20	20	673	57	2,342	1,645	8	9
Total	397	535	7,542	1,662	11,559	36,515	259	158
First 15 weeks of year	8,872	10,488	115,818	95,046	128,696	388,695	3,509	1,984

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr 13, 1935	Week ended Apr 11, 1936	Week ended Apr. 13, 1935
New England States:								
Maine	0	0	11	18	0	0	1	7
New Hampshire	0	0	10	16	0	0	0	1
Vermont	0	0	7	9	0	0	0	0
Massachusetts	0	0	312	238	0	0	0	2
Rhode Island	0	0	35	13	0	0	0	0
Connecticut	0	0	47	105	0	0	0	1
Middle Atlantic States:								
New York	2	0	986	1,362	0	0	5	6
New Jersey	0	0	341	194	0	0	0	0
Pennsylvania	0	0	348	755	0	0	4	8
East North Central States:								
Ohio	0	0	261	895	1	2	16	4
Indiana	1	0	287	145	3	0	2	1
Illinois	0	1	789	1,397	4	2	6	9
Michigan	0	1	318	368	0	0	4	4
Wisconsin	0	2	586	477	3	20	6	2
West North Central States:								
Minnesota	0	1	402	304	4	6	0	0
Iowa	0	0	204	72	47	0	0	0
Missouri	0	0	167	41	19	0	2	1
North Dakota	0	0	42	76	4	3	2	0
South Dakota	0	0	79	14	44	14	0	0
Nebraska	0	1	170	36	24	44	0	0
Kansas	0	0	351	75	45	21	0	1
South Atlantic States:								
Delaware	0	0	10	17	0	0	1	0
Maryland [3]	0	1	58	125	0	0	0	3
District of Columbia	0	0	18	74	0	0	1	0
Virginia	1	0	56	46	0	0	4	3
West Virginia	0	0	39	97	0	0	3	14
North Carolina	1	1	14	22	0	1	1	1
South Carolina [3]	0	0	3	6	0	0	2	3
Georgia	0	0	20	8	0	0	2	7
Florida	0	0	3	3	0	0	1	0
East South Central States:								
Kentucky	0	2	47	41	0	1	7	10
Tennessee	0	0	28	33	0	0	5	8
Alabama	0	0	6	7	0	5	0	3
Mississippi [3]	1	1	6	7	0	0	0	6

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 11, 1936, and Apr. 13, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935	Week ended Apr. 11, 1936	Week ended Apr. 13, 1935
West South Central States:								
Arkansas	0	0	5	1	0	0	0	0
Louisiana	0	1	15	7	0	1	5	12
Oklahoma [4]	0	0	30	3	3	0	1	2
Texas	0	1	165	86	1	10	13	6
Mountain States:								
Montana	1	0	93	10	15	0	0	0
Idaho	0	0	35	11	1	0	0	0
Wyoming	0	1	51	4	2	7	0	0
Colorado	0	0	107	215	0	4	0	1
New Mexico	0	0	56	5	0	5	0	0
Arizona	0	0	28	24	0	0	0	0
Utah [2]	0	0	55	95	1	0	0	0
Pacific States:								
Washington	0	2	85	56	22	15	0	1
Oregon [5]	1	0	54	54	3	4	3	5
California	4	6	289	234	0	4	2	4
Total	12	22	7,138	7,905	246	169	98	144
First 15 weeks of year	284	378	116,711	107,855	3,459	2,918	1,661	1,940

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Apr. 11, 1936, South Carolina, 1 case.
[4] Exclusive of Oklahoma City and Tulsa.
[5] Rocky Mountain spotted fever, week ended Apr. 11, 1936: Oregon, 3 cases.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March 1936										
California	37	143	6,765	6	11,313	13	14	1,558	19	15
Connecticut	7	12	106		357		1	524	0	4
Maine	1	6	42		947		2	58	0	4
North Carolina	24	55	1,265		311	43	3	149	4	13
Wyoming	5	7	58		41		1	444	23	0

March 1936

	Cases
Chicken pox:	
California	2,652
Connecticut	437
Maine	116
North Carolina	415
Wyoming	29
Conjunctivitis, infectious:	
Connecticut	21
Dengue:	
North Carolina	1
Dysentery:	
California (amoebic)	5
California (bacillary)	10
Epidemic encephalitis:	
California	4
Connecticut	3
Maine	1
Food poisoning:	
California	31
German measles:	
California	1,538
Connecticut	1,582
Maine	307
North Carolina	1,064
Granuloma, coccidioidal:	
California	4
Lead poisoning:	
Connecticut	1
Mumps:	
California	2,279
Connecticut	267
Maine	1,046
Wyoming	62
Ophthalmia neonatorum:	
California	2
Connecticut	1
North Carolina	1
Paratyphoid fever:	
California	3
Rabies in animals:	
California	94
Rocky Mountain spotted fever:	
Wyoming	1
Septic sore throat:	
California	15
Connecticut	21
Maine	1
North Carolina	5
Wyoming	10
Tetanus:	
California	3
Trachoma:	
California	17
Connecticut	1
Trichinosis:	
California	2
Connecticut	4
Tularaemia:	
North Carolina	3
Typhus fever:	
North Carolina	4
Undulant fever:	
California	15
Connecticut	8
Maine	1
North Carolina	4
Vincent's infection:	
Maine	7
Whooping cough:	
California	1,182
Connecticut	423
Maine	103
North Carolina	133
Wyoming	12

PLAGUE IN SONOMA COUNTY, CALIF.

Under date of April 13, 1936, the Director of Public Health of California reported a case of human plague in a male patient removed from Santa Rosa, Sonoma County, Calif., to San Francisco Isolation Hospital. The diagnosis was confirmed bacteriologically and by animal inoculation. Santa Rosa is suspected as the source of the infection.

WEEKLY REPORTS FROM CITIES

City reports for week ended Apr. 4, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	1	6	0	0	0	2	10	23
New Hampshire:											
Concord	0	------	0	0	2	2	0	0	0	0	14
Manchester	0	------	0	0	1	0	0	0	2	0	12
Nashua	------	------	------	------	------	------	------	------	------	------	------
Vermont:											
Barre	0	------	0	1	1	0	0	0	0	0	6
Burlington	0	------	0	26	0	0	0	0	0	0	10
Rutland	0	------	0	109	3	3	0	0	0	8	5
Massachusetts:											
Boston	3	------	0	381	23	110	0	6	0	41	216
Fall River	1	------	0	1	4	22	0	0	0	0	33
Springfield	0	------	0	1	1	7	0	0	0	3	32
Worcester	0	------	0	2	1	18	0	3	0	17	48
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	16
Providence	0	------	0	22	5	16	0	1	0	8	57
Connecticut:											
Bridgeport	0	13	1	1	2	1	0	1	0	2	45
Hartford	0	------	0	1	6	12	0	2	2	2	49
New Haven	0	4	0	0	1	1	0	0	0	47	34
New York:											
Buffalo	0	2	0	58	22	70	0	14	0	9	161
New York	48	17	9	2,011	150	519	0	80	4	75	1,562
Rochester	0	------	1	1	7	3	0	0	0	0	76
Syracuse	0	------	3	38	12	13	0	0	0	14	46
New Jersey:											
Camden	1	------	0	16	2	7	0	0	0	3	27
Newark	0	4	0	2	16	181	0	9	0	18	110
Trenton	0	------	1	2	2	7	0	3	0	7	34
Pennsylvania:											
Philadelphia	10	13	9	533	78	86	0	26	0	52	560
Pittsburgh	2	8	7	30	48	86	0	6	0	27	194
Reading	0	------	0	2	1	3	0	2	0	2	28
Scranton	0	------	------	2	------	6	0	------	0	0	------
Ohio:											
Cincinnati	6	1	1	11	16	19	0	5	0	0	143
Cleveland	4	72	8	54	29	71	0	18	1	56	221
Columbus	1	4	4	2	9	6	0	2	0	6	88
Toledo	0	1	1	83	5	1	0	8	0	16	88
Indiana:											
Anderson	0	------	0	0	2	1	0	0	0	7	18
Fort Wayne	2	2	0	0	6	10	0	1	0	0	26
Indianapolis	1	0	2	5	32	36	0	3	0	8	112
Muncie	0	------	1	0	4	0	0	2	0	0	------
South Bend	0	------	0	0	4	1	0	0	0	7	17
Terre Haute	0	------	0	0	0	8	0	0	0	0	19
Illinois:											
Alton	0	------	0	0	2	4	0	0	0	4	11
Chicago	18	21	10	7	66	229	0	43	0	171	801
Elgin	0	------	0	0	1	4	0	0	0	2	7
Moline	0	2	0	0	2	6	0	0	0	8	9
Springfield	0	------	0	0	5	18	0	1	0	6	20

City reports for week ended Apr. 4, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
Michigan:											
Detroit	5	11	15	37	61	134	0	21	1	141	354
Flint	1	------	0	0	4	10	0	1	0	14	19
Grand Rapids	0	------	0	11	1	15	0	0	0	7	28
Wisconsin:											
Kenosha	0	------	0	1	0	7	0	0	0	0	8
Madison	0	------	0	0	1	14	0	0	1	4	13
Milwaukee	0	------	0	4	6	76	0	2	0	48	85
Racine	0	------	0	3	2	14	0	0	0	8	17
Superior	0	------	0	1	0	26	0	0	0	0	14
Minnesota:											
Duluth	0	------	0	0	1	10	0	0	0	14	17
Minneapolis	1	------	0	189	8	121	0	2	0	9	90
St. Paul	5	2	2	137	4	30	0	3	0	3	66
Iowa:											
Cedar Rapids	0	------	------	0	------	1	0	------	0	1	------
Davenport	0	------	------	0	------	11	0	------	0	0	------
Des Moines	1	------	------	0	------	10	0	------	0	0	32
Sioux City	0	------	------	0	------	12	28	------	0	0	------
Waterloo	0	------	------	0	------	2	0	------	0	0	------
Missouri:											
Kansas City	1	------	8	0	20	49	0	3	0	0	107
St. Joseph	0	------	2	0	6	3	1	1	1	0	35
St. Louis	14	18	3	1	47	50	0	6	0	1	307
North Dakota:											
Fargo	0	------	0	0	0	4	1	0	0	0	6
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	5	0	0	1	0	6
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	------	0	------	11	11	------	0	0	------
Nebraska.											
Omaha	1	------	1	5	7	105	16	2	0	0	72
Kansas:											
Lawrence	0	7	2	1	1	2	0	0	0	0	11
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	------	1	0	2	0	0	1	0	0	34
Delaware:											
Wilmington	5	------	0	4	4	2	0	1	0	6	33
Maryland:											
Baltimore	2	14	2	110	36	26	0	16	1	46	200
Cumberland	0	------	0	0	1	3	0	1	0	0	15
Frederick	0	------	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	11	1	1	45	20	16	0	5	1	16	171
Virginia:											
Lynchburg	0	------	1	8	1	3	0	0	0	17	16
Norfolk	1	15	0	1	5	3	0	1	0	0	35
Richmond	0	------	1	4	8	40	0	2	1	0	57
Roanoke	0	------	1	0	2	1	0	1	0	0	17
West Virginia:											
Charleston	1	8	0	2	13	1	0	0	0	0	28
Huntington	0	------	------	0	------	0	0	------	0	0	------
Wheeling	0	------	0	24	4	0	0	0	1	2	28
North Carolina:											
Gastonia	0	------	0	0	0	0	0	0	0	0	3
Raleigh	0	------	0	1	1	0	0	0	0	3	20
Wilmington	1	------	0	0	4	1	0	0	0	0	13
Winston-Salem	0	------	1	101	1	3	0	1	0	0	13
South Carolina:											
Charleston	0	11	0	0	0	1	0	1	0	10	18
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	1	0	0	0	0	0	15
Greenville	1	------	0	18	1	0	1	0	0	0	5
Georgia:											
Atlanta	3	21	4	3	15	8	0	5	0	0	90
Brunswick	0	------	0	0	4	0	0	0	0	0	5
Savannah	0	10	3	0	5	3	0	1	1	0	36
Florida:											
Miami	0	9	3	9	2	2	0	2	0	18	45
Tampa	0	1	1	0	4	1	0	0	1	0	25

City reports for week ended Apr. 4, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Death all causes
Kentucky:											
Ashland	0	0	------	0	------	0	0	------	0	3	------
Covington	0	------	0	1	11	1	0	1	0	0	16
Lexington	0	5	0	5	4	2	0	2	0	2	21
Louisville	1	22	0	4	18	32	0	4	0	18	87
Tennessee:											
Knoxville	1	3	3	46	9	2	0	0	0	0	40
Memphis	0	------	18	1	19	9	0	5	6	12	109
Nashville	0	------	4	3	15	1	0	3	0	0	60
Alabama:											
Birmingham	1	40	5	0	4	1	0	4	0	0	100
Mobile	0	10	1	0	1	0	1	0	0	0	23
Montgomery	0	6	------	0	------	1	0	------	0	7	------
Arkansas:											
Fort Smith	0	------	------	0	------	0	0	------	0	0	------
Little Rock	0	115	0	0	4	0	0	2	1	0	6
Louisiana:											
Lake Charles	0	------	0	1	0	0	0	0	0	0	5
New Orleans	5	206	26	36	26	8	0	17	0	24	247
Shreveport	0	0	1	9	13	0	0	0	0	0	39
Oklahoma: Oklahoma City	1	14	2	0	14	8	0	1	0	6	44
Texas:											
Dallas	8	9	9	43	13	4	0	1	0	0	72
Fort Worth	0	------	1	0	9	6	0	2	0	0	39
Galveston	3	------	0	4	5	0	0	0	2	0	16
Houston	13	------	1	14	7	8	0	7	0	0	59
San Antonio	1	------	4	10	9	4	0	6	0	0	85
Montana:											
Billings	0	------	0	0	1	4	0	0	0	0	8
Great Falls	0	------	0	0	1	8	0	0	0	0	8
Helena	0	------	0	0	0	1	0	0	0	0	3
Missoula	0	------	0	0	0	4	0	0	0	0	8
Idaho: Boise	0	------	0	18	1	2	0	0	0	0	10
Colorado:											
Colorado Springs	0	------	0	1	3	4	1	------	------	1	15
Denver	7	------	1	15	10	14	0	5	0	23	97
Pueblo	0	------	0	0	0	20	0	0	0	9	8
New Mexico: Albuquerque	0	2	0	0	8	16	0	3	0	0	19
Utah: Salt Lake City	0	------	0	13	3	43	0	1	0	3	35
Nevada: Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	1	------	2	180	8	13	1	7	0	0	102
Spokane	0	------	0	14	6	23	0	0	0	5	31
Tacoma	0	------	0	29	5	0	1	0	0	7	42
Oregon:											
Portland	0	9	1	73	4	10	0	6	4	2	80
Salem	0	4	------	6	------	2	4	------	0	0	------
California:											
Los Angeles	4	26	0	495	20	55	0	15	0	26	321
Sacramento	2	1	1	6	4	8	0	4	0	4	33
San Francisco	0	3	1	473	15	84	0	5	0	30	149

City reports for week ended Apr. 4, 1936—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	6	1	0
Fall River	0	1	0
Rhode Island:			
Providence	0	2	0
Connecticut:			
New Haven	1	0	0
New York:			
New York	18	10	1
New Jersey			
Newark	4	2	0
Pennsylvania:			
Pittsburgh	1	0	0
Ohio:			
Cincinnati	1	1	0
Cleveland	1	0	0
Indiana:			
Indianapolis	0	2	0
Illinois:			
Chicago	9	3	0
Michigan:			
Detroit	1	0	0
Flint	1	0	0
Wisconsin:			
Madison	1	0	0
Milwaukee	1	0	0
Minnesota:			
Minneapolis	1	1	0
Iowa:			
Des Moines	1	0	0
Missouri:			
St. Joseph	0	1	0
St. Louis	2	1	0
Nebraska:			
Omaha	1	0	0
Maryland:			
Baltimore	9	3	0
District of Columbia:			
Washington	7	2	0
Virginia:			
Norfolk	2	0	0
Richmond	1	2	0
West Virginia			
Huntington	1	0	0
Wheeling	0	0	1
North Carolina:			
Wilmington	0	1	0
South Carolina:			
Charleston	2	0	0
Georgia:			
Atlanta	1	2	0
Kentucky:			
Ashland	1	0	0
Lexington	1	0	0
Louisville	3	2	0
Tennessee:			
Knoxville	1	1	0
Alabama:			
Birmingham	3	1	0
Louisiana:			
New Orleans	2	1	0
Oklahoma:			
Oklahoma City	2	0	0
Texas:			
Dallas	1	1	0
Galveston	2	0	0
Houston	11	2	0
San Antonio	1	1	0
Colorado:			
Colorado Springs	1	0	0
Denver	1	0	0
Oregon:			
Portland	1	1	1
California:			
Los Angeles	3	3	0
San Francisco	1	1	0

Epidemic encephalitis.—Cases: Chicago, 1; Flint, 1; Baltimore, 1.
Pellagra.—Cases: Atlanta, 2; Savannah, 2; Montgomery, 1; New Orleans, 1; Los Angeles, 2.

FOREIGN AND INSULAR

ITALY

Communicable diseases—4 weeks ended February 2, 1936.—During the 4 weeks ended February 2, 1936, cases of certain communicable diseases were reported in Italy as follows:

Disease	Jan. 6-12		Jan. 13-19		Jan. 20-26		Jan. 27-Feb. 2	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	19	17	8	8	10	10	15	13
Cerebrospinal meningitis	19	17	15	14	16	14	18	17
Chicken pox	384	148	344	131	370	142	361	140
Diphtheria and croup	604	305	620	319	595	319	601	310
Dysentery	4	4	5	5	6	6	6	6
Hookworm disease	4	4	21	6	3	3	3	3
Lethargic encephalitis	2	2	2	2	2	2	3	3
Measles	1,179	225	1,366	242	1,469	263	1,582	280
Paratyphoid fever	49	35	35	31	40	36	41	37
Poliomyelitis	8	8	9	9	13	13	16	15
Puerperal fever	33	31	41	38	41	37	41	39
Scarlet fever	320	144	331	167	347	146	299	145
Typhoid fever	258	168	275	172	279	176	222	134
Undulant fever	22	18	35	27	38	28	43	39
Whooping cough	350	100	335	101	312	106	365	120

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Week ended— January 1936: 4	11	18	25	February 1936: 1	8	15	22	29	March 1936: 7	14	21	28
Ceylon: Batticaloa (near).[1]																		
India	C	51,707	29,882	25,638	11,615	3,695	3,391	3,674	3,473	2,967	2,891	2,606						
	D	24,303	15,039	13,350	6,169	1,948	1,873	2,014	1,964	1,653	1,496	1,389						
Assam	C	585	164	658	707	72	77	120	49	35		21	21	15	8	12	8	31
	D	286	79	356	396	46	39	62	20	19		11	7	9	4	7	5	14
Bombay Presidency	C	7,779	3,318	1,892	941	74	149	157	79	141	63	54	35	39				
	D	3,328	1,510	877	445	44	75	79	39	58	31	25	10	25				
Bombay	C	3		[2] 1														
Calcutta	C	119	90	144	103	15	28	57	40	47	58	61	79	135	227	188	179	208
Central Provinces and Berar	C	11,774	5,775	1,350	98	13	1					8	18	30	26	45	52	94
Chittagong	C			1														
Cochin	D	11	9															
Madras Presidency	C	8,185	4,648	5,280	2,855	1,583	186		2,101									
	D	3,482	2,114	2,527	1,336	786	94		1,133									
Madras	C	31	8	12	13		2	3	4	11	28	18	3	10	5	4	12	5
	D	15	1	4	7			1	2	6	6	8	4	2	3	3	5	
Moulmein	C												1	1	5	1	1	3
Negapatam	C				7	3	7	5	7	2	14	5	18	17	2		4	
	D				4	2	4		2		6	9	7	5	2			
Northwest Frontier Province	C	338	12					1			1							
	D	174	11															
Punjab	C	302	154	24	7		1											
Rangoon	C			[2] 1		[2] 1												
India (French):																		
Chandernagor	C	1					4	2	2	1	1	1						
Karikal	C		4	12														
Pondichery	C	83	16	5														
Indochina (see also table below): Pnom-Penh	C		1															

Siam:																		
Ang Thoang Province	C		16	3							1	1	1					
	D		9	3							1	1	1					
Ayudhaya Province	C	46	30	25	40	17	9	23	25	31	46	45	53	30				
	D	31	25	16	35	11	6	16	16	27	28	35	41	28				
Bangkok	C	43	44	77	49	17	21	39	47	31	52	96	91	75	43	38	30	15
Bejrapuri Province	C	14	14	3		1	9	20	26	19	9	15	13	10				
Bichitr Province	C														P			
Bisnulok Province	C												1	12				
Chachoengsao Province	C				56	14	60	57	44	51	23	11	8	2				
Jalapuri Province	C				3	6	1	8	5		9	1		2				
Jayanad Province	C													13				
Lobpuri Province	C				10						2	3	1	1				
Nagara Nayok Province	C										2	5		3				
Nagara Pathom Province	C		11	25	1	3	1						4	7				
Nagara Rajsima Province	C										1	1						
Nagara Svarga Province	C										7	6	1	1				
Nondpuri Province	C	2	8	19	3	1		2	4		12	2	2	5				
Prachinpuri Province	C			14	54	5	7	12	2	4								
Pradumdhani Province	C		6	2	1		1		3	14	5	7	3	12				
Rajpuri Province	C	107	18	36	54	24	29	10		5	3	1		7				
Sarapuri Province	C		6	17			2			15	41	27	16	5				
Singhapuri Province	C		11	15	2		1						1					
Samudprakar Province	C	5	5	6	49	5	1	6	3	25	48	27	20	36				
Samudsagara Province	C	9	9	7	36	8	25	16	9	14	17	25	9	11				
Samudsongram Province	C	56	23	34	38	16	12	8	13	14	12	21	20	17				
Suphanpuri Province	C			18								4	6	3				
Upala Rajdhani Province	C														P			
Utradith Province	C															P		
On vessels:																		
S. S. *Egra* at Rangoon	C						1											
S. S. *Floristan* at Masulipatam	C							[2] 1										

Place		October 1935			November 1935			December 1935			January 1936			February 1936	
		1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20
Indochina (French) (see also table above):															
Cambodia [4]	C		1				1				1		1	4	7
	D		1								1		1	3	1
Cochinchina [4]	C		1			1	1		2	1			2	2	
	D		1			1			2	1			2	2	

[1] According to a report dated Apr. 7, 1936, 29 cases of cholera with 24 deaths were reported in the vicinity of Batticaloa, Ceylon, from Mar. 30 to Apr. 7, 1936.
[2] Imported.
[3] Suspected.
[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Sept. 1-28, 1935	Sept. 29-Oct 26, 1935	Oct 27-Nov 30, 1935	Dec 1-28, 1935	Week ended— January 1936 4	11	18	25	February 1936 1	8	15	22	29	March 1936 7	14	21	28
Algeria: Philippeville	C		3															
Argentina (see also table below):																		
Bahia Blanca (vicinity of)	C													2				
	D													2				
Pampa Territory—Leventue.[2]																		
San Luis.[3]																		
Azores. (See table below.)																		
Basutoland	C													2				
Belgian Congo	C	2	1															
Plague-infected rats			3															
Brazil[4] (See also table below.)																		
British East Africa:																		
Kenya	C	33	10	7	25	4	1	2	3	4	4	3	5	6		2		
Tanganyika	C								7			1	1		5			
Uganda	C	188	206	281	61	6	7	19	12	6	8	3	8	19	14			
	D		188	231	54	5	6	18	11	5	8	3	8	18	13			
Ceylon:																		
Anuradhapura	C																1	
Balapitiya	C			1														
Colombo	C	11	6	5	11	3	2	2	3	1		2	2	1	1			2
	D	8	6	4	10	3	2	2	2	1		2			1			2
Plague-infected rats			4	27	4									1		1		
Ratnapura	C		1															
Tellijjawila	C		1															
China: Manchuria.[5]																		
Dutch East Indies: West Java	C	868	769	985	878	190												
	D	866	769	980	873	190	157											
Ecuador:																		
Daule.[6]																		
Duran	C		1															
Guayaquil	C	8	35	48	20		3	4	1		2	1	2	1		1		
	D	3	15	16	4		1	3	2	1	2							
Plague-infected rats			8	12	5	1	1								1			
Nobol	C		1															

Egypt:																		
Alexandria—Plague-infected rats		P	P	P	P		P		P		P		P		P			
Assiut Province	C			1	3	1	3	2	1	3	1	2	1	3	1	1	4	7
Girga Province	C							1		1			1					1
Minya Province	C													2		1	4	
Qena Province	C		1															
Great Britain—England—Liverpool—Plague-infected rats					2													
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district—																		
Hamakua Mill				1	1								1					
Kukaiau			1	2	1													
Paauhau		1	2			1												
Pohakea Sector [7]												1						
Maui Island—Makawao district—Kahului (0-10 miles from)		1																
India	C	1,433	2,635	3,131	1,852	416	497	827	429	661	545	761						
	D	633	1,228	1,019	928	197	297	396	254	267	349	328						
Bassein	C	3	1		1						3	1	3		1	2	1	
Plague-infected rats				1								1						
Bombay Presidency	C	163	363	148	88	15	32	28	24	15	28	39	38	51				
	D	94	234	93	48	8	22	18	13	17	20	15	24	34				
Bombay	C								[8] 1									
Central Provinces and Berar	C	483	464	1,651	716	55	137		2	28	75	165	150	166			345	111
Karachi	C															5		
Madras Presidency	C	111	121	133	71	10	7		25									
	D	46	73	88	51	4	4		18									
Punjab	C			48						1					7	2	3	
	D			21											3	2		
Rangoon	C	1	1		[8] 1							[8] 1						
Plague-infected rats		1	1		1					1	1		1			2		
Indochina (see also table below):																		
Pnom-Penh	C								1					1				
Saigon-Cholon	C								1									
Iraq: Baghdad	C	1		1	1	[8] 1												
Madagascar. (See table below.)																		
Peru. (See table below.)																		
Senegal. (See table below.)																		
South-West Africa. (See table below.)																		
Tunisia: Tunis	C	10	2	1														
	D	2		1														
Plague-infected rats				1								2						

[1] Including plague in the United States and its possessions.
[2] A report dated Aug. 8, 1935, states that 4 cases of plague occurred at Leventue, Pampa Territory, Argentina, during 2 months.
[3] A report dated Aug. 2, 1935, states that plague-infected rats were present at San Luis, Argentina.
[4] Reports of plague in Brazil have also been received under the dates indicated, as follows: July 25, 1935, 4 cases at Vicosa, Alagoas State; July 2, 1935, about 16 deaths in Fiera Santana, Bahia State, since Jan. 1; July 26, 1935, 10 cases in Ceara State since Jan. 1; Sept. 10, 1935, 204 cases with 72 deaths in Pernambuco State up to Aug. 24; Oct. 8, 1935, 4 cases and 1 death at Paulista, Piauhy State.
[5] A report dated Oct. 28, 1935, states that up to Oct. 23, 155 deaths from plague were reported in the provinces of Kirin, Lungkiang, Fengtien, and South Hsingan, Manchuria, China. A report dated Nov. 27, 1935, stated that 23 deaths from plague had occurred in the vicinity of Koshan, and that there were about 15 cases in Harbin.
[6] During the period Jan. 1 to Feb. 20, 1936, 7 cases of plague were reported at Daule and vicinity, Ecuador.
[7] During the week ended Apr. 4, 1936, 1 rat was proved positive for plague at Pohakea Sector, Hamakua district, Hawaii Island, Hawaii Territory. [8] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Week ended— January 1936				February 1936					March 1936			
						4	11	18	25	1	8	15	22	29	7	14	21	28
Union of South Africa	C	8	18	7	7	24 [9]	-	20 [9]	-	91 [9]	-	18 [9]	-	35 [9]	-	22 [9]	-	-
Cape Province	C	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Orange Free State	C	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
United States: California.[10]																		
On vessel: S. S. *Ipanema* at Marseille	C	-	[11] 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Place		September 1935	October 1935	November 1935	December 1935	January 1936	February 1936
Argentina (see also table above):							
Buenos Aires Province	C	-	-	-	-	-	2
Cordoba Province	C	-	-	-	5	1	-
Santa Fe	C	-	-	-	-	1	-
Azores	C	4	2	2	2	3	-
Basutoland	C	-	-	-	16	-	-
Brazil:							
Bahia State	C	7	3	7	20	-	-
Ceara State	C	-	-	-	-	-	7
Pernambuco State.[12]							
Indochina (see also table above):							
Cambodia	C	1	-	-	-	1	2
Cochinchina	C	-	-	1	-	1	-
Madagascar (central region)	C	232	293	345	507	503	-
	D	227	282	333	485	485	-
Peru	C	3	1	14	9	23	19
Arequipa Department	C	-	-	-	-	5	-
Catamarca Department	C	-	-	13	-	-	-
Lambayeque Department	C	-	-	-	1	4	3
Libertad Department	C	1	1	1	-	5	1
Lima Department	C	2	-	10	7	9	8
Callao	C	-	-	-	-	1	2
	D	-	-	-	-	1	2
Senegal:							
Baol [13]	C	8	-	-	-	-	-
Dakar [13]	C	-	-	-	-	1	1
	D	-	-	-	-	1	1
Tivouane [13]	C	11	1	1	1	-	-
South-West Africa: Ovamboland	C	[14] 185	-	-	-	-	-

[9] For 2 weeks.
[10] Plague has been reported in California as follows: Apr. 3, 1936, 1 plague-infected squirrel at Ventura County, and on Apr. 18, 1936, 1 human case of plague was reported at San Francisco having been brought from Santa Rosa, Calif.
[11] One of these cases was a member of the crew and the other was a stevedore believed to have worked on the vessel. Several plague-infected rats were reported found on board the vessel.
[12] From Jan. 1 to Mar. 16, 1936, 15 cases of plague were reported in Pernambuco State, Brazil.
[13] Incomplete reports.
[14] From Jan. 1 to Sept. 30, 1936.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Week ended— January 1936 4	11	18	25	February 1936 1	8	15	22	29	March 1936 7	14	21	28
Algeria: Algiers Department	C	5										1	1					
Argentina. (See table below.)																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil: Santos	C	2																
British East Africa:																		
Tanganyika	C	36	6	18					9	6		2						
Uganda	C							8	2	1	1	3		7	4			
British Somaliland	C	25	4	3	7	2	1	1			31		3					
British South Africa:																		
Northern Rhodesia	C	1																
Southern Rhodesia	C		1									1						
Canada:																		
Alberta	C			[1] 1			[1] 1						1	2	4	18	5	3
British Columbia	C	5	[1] 1	[1] 1	2			1	1									
Saskatchewan	C		[1] 3	[1] 1														
Ceylon: Colombo	C							1										
China:																		
Amoy	C												2					
Dairen	C										3							
Foochow	C	P	P	P	P		P		P		P		P		P			
Hangchow	C				1		1	2		1	2		11	1				
Hankow	C									1	1	1		1				
Hong Kong	C			2											2	1	2	1
Nanking	C			26	43	1	7	5	3	8	11	10	9	3				
Shanghai	C	1	2	4	6	1	1	2	1	4	2	9	5	10	7	6	7	3
Swatow	C	1		3	1								1	1				
Tientsin	C				3													
Chosen. (See table below.)																		
Colombia	C	111		44	32	7	11	20	30		[1] 13							
Bogota	C			8	3													
Dahomey. (See table below.)																		
Dutch East Indies: Palembang	C														1			
Ecuador. (See table below.)																		
Egypt: Provinces	C											2			5			

[1] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Week ended— January 1936: 4	11	18	25	February 1936: 1	8	15	22	29	March 1936: 7	14	21	28
Eritrea	C	14	7									1						
Asmara	C		4															
France. (See table below.)																		
Greece: Saloniki	C	6		4			2	2	2	2	3	3	3	3	5			
Guatemala. (See table below.)																		
Honduras: Tela	C		2															
India	C	5,530	4,147	8,642	9,617	4,618	4,755	5,146	5,364	5,660	6,951	6,830						
	D	1,256	865	1,762	2,106	857	962	1,231	1,170	1,387	1,592	1,641						
Assam	C	19	10	17	168	38	18	23	37	303	59	130	164	142	85	84	64	88
Bassein	C						[1]1											
Bombay Presidency	C	748	487	635	741	279	490	398	536	504	662	713	801	764				
	D	133	65	90	103	67	60	66	89	104	111	122	165	148				
Bombay	C	24	11	21	30	13	22	18	33	38	46	47	72	63	54	64	78	81
	D	18	4	12	21	8	15	9	17	19	27	21	46	36	34	37	43	43
Calcutta	C	24	13	19	88	49	106		116	223	270	309	378	426	330	464		511
	D	15	5	12	56	29	45		59	131	180	24	258	300	272	312		361
Central Provinces and Berar	C	114	330	475	808	125	386	340	415	415	965	502	280	490	479	549	541	540
Chittagong	D							1					1					
Cochin	C		5	1						6			8	7	2		5	
Karachi	C	1	2	3	11		7	9	1	8	10	16	26	17	12	5	6	5
Madras Presidency	C	2,246	1,664	1,811	1,366	529	76		707			96						
	D	401	339	324	269	80	6		90			23						
Madras	C	10	1	7	5	1	2				1		1	1		4	7	1
Moulmein	C	5		2	6	1		6	20	16		17	18	15	26	22	20	15
Negapatam	C	3	2			2			1		1	1						
Northwest Frontier Province	C	2		9	7	4	11		11	6	5	5	29	5		1		
Punjab	C	79	99	336	313	148	83	118	149	116	111	173	183	58	92	140	100	
Rangoon	C	2	1	[1]1	4		[1]2	1	[1]6	[1]1	1	3	4	1	2	7	5	2
Tuticorin	C	12	11	3	5													
Vizagapatam	C	14	18	6	9	4	10	15	7	12	9	2	4	12	1	2	11	5
India (French):																		
Chandernagor	C	5	4	44														
Karikal	C	12	25	1														
Pondichery	C	22	11	3														
	D	24	8	3		3	1		3									

Indochina (see also table below): Haiphong	C													1				
Iran	C	3	19	3	12	8			1	12								
Teheran	C	2	3															
	D	1	1															
Iraq	C		11	8	36	7	20	28	3	7	9	4	18	2	5	1	1	3
Baghdad	C			2			1											
Basra	C		1	1														
Italian Somaliland	C			2														
Japan:																		
Moji	C														1			
Osaka	C																5	
Yamaguchi Prefecture	C				4				1									
Libya: Tripolitania	C					2												
Mexico (see also table below):																		
Chihuahua	C			1					1					1				
Guadalajara	D	2	1	9	16	4	5	4		8	9		14	15	14	13	6	6
Mazatlan	C			1						1					1	1		
Mexico, D. F	C	19	3	12	5	2	2			3	5	2		1				
Monterrey	C		1	1										2	2			
San Luis Potosi	D	4														1		
Torreon	C			5	1	1										1		1
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	290	289	146	427	8		76		265		[1] 252						
Niger Territory. (See table below.)																		
Nyasaland. (See table below.)																		
Oman: Sharjah and Pirate Coast	C					750			[3] 125				[3] 70					
Peru. (See table below.)																		
Poland	C			1							1							
Portugal (see also table below): Lisbon	C	2	3	5	8	1	2			1		1		3	1		1	
Portuguese East Africa. (See table below.)																		
Salvador. (See table below.)																		
Saudi Arabia	C			4										8				
Sierra Leone	C	288	110	222	116	[1] 31		[1] 6		[1] 41		[1] 67						
Freetown	C	2	7		2							[1] 1						
Spain	C	12	7	1	1	3	9	7	1			1	4	7	1	2		
Straits Settlements: Singapore	C	1																
Sudan (Anglo-Egyptian)	C			2		3						2	1	2	12			
Syria: Tripoli	C		1															
Turkey. (See table below.)																		
Union of Soviet Socialist Republics. (See table below.)																		
Uruguay. (See table below.)																		

[1] For 2 weeks. [2] Imported. [3] For 3 weeks.

On vessels:
- S. S. *Talamba* at Rangoon from Madras .... 1 case ..... Sept. 9, 1935
- S. S. *Ethiopia* at Rangoon from Madras .... 1 case ..... Oct. 4, 1935
- S. S. *Ekma* at Rangoon from Calcutta .... 1 case ..... Dec. 10, 1935
- S. S. *Cape St. Francis* at Rangoon from Calcutta .... 1 case ..... Dec. 17, 1935
- S. S. *Bankura* at Karachi .... 1 case ..... Jan. 4, 1936

On vessels—Continued.
- S. S. *Jalgopal* at Rangoon from Aracan .... 1 case ..... Jan. 5, 1936
- S. S. *Matua* at Suez from Calcutta .... 1 case ..... Jan. 21, 1936
- S. S. *Khosrou* at Kamaran quarantine station .... 1 case ..... Feb. 15, 1936
- S. S. *Karapara* at Rangoon from Calcutta .... 1 case ..... Mar. 9, 1936

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Contined

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		September 1935	October 1935	November 1935	December 1935	January 1936	February 1936
Argentina:							
Buenos Aires Province	C						4
Entre Rios Province [4]	C						5
Belgian Congo	C	303	348		54	456	
Bolivia	C	57	23	38	43	48	
China: Manchuria—Harbin	C		1		1	1	
Chosen	C	16	53	53	53	86	
Dahomey	C	3		31	11		
Ecuador: Guayaquil	C						1
France	C	6	16	7	18	76	24
Guatemala	C	4		1		2	14
Indochina (see also table above)	C	108	98	66	44	57	229
	D	16	12	10	3	3	31

Place		September 1935	October 1935	November 1935	December 1935	January 1936	February 1936
Mexico (see also table above):							
Mexico City	C	2	2			9	1
Morocco	C	1				9	
Mozambique	C	37	15	1			
Niger Territory	C	111	127		43		
Nyasaland	C	14	24	19			
Peru	C	141		7			
Portugal (see also table above)	C	52	154	108	74		
	D	9	34	26	11		
Portuguese East Africa	C					3	
Salvador	C			36	12	32	46
Turkey	C		1			5	
Union of Soviet Socialist Republics	C	47					
Uruguay	C					3	

[4] A report dated Oct. 26, 1935, states that 19 cases of smallpox have been reported in Entre Rios Province, Argentina.

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Sept. 1-28, 1935	Sept. 29-Oct. 26, 1935	Oct. 27-Nov. 30, 1935	Week ended—															
					December 1935				January 1936				February 1936					March 1936		
					7	14	21	28	4	11	18	25	1	8	15	22	29	7	14	21
Algeria:																				
Algiers Department	C	1	1	1							1	8	3	6		15	7	7		
Algiers	C								1											
Constantine Department	C	4	5	1			1		3	18		4	5	24	10	10	11		10	
Bone	C	2								1										
Constantine	C	1	1						2	1									1	

Oran Department	C											7			50	2	1		12	
Australia: Sydney	C			2								1								
Belgian Congo	C		1																	
Bolivia. (See table below.)																				
Bulgaria	C	1																		
Chile	C	285	473	691																
Concepcion	C	32	21																	
Santiago [1]	C	172	333																	
Valparaiso	C	24	26	56	6	15	10	6	3	2		7	6	8	5	6	4	2	1	
China:																				
Canton	C			2																
Hankow	C	1	8	1																
Hong Kong	C	1																		
Nanking	C			1																
Shanghai	C					1	1	1												
South Manchuria Railway Zone	C	2		4																
Tientsin	C			1												1				
Tsingtao	C	7					3							1						
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C				1					1									3	1
Asyut Province	C		1	1										5	2				1	
Beheira Province	C	2	10	11	8		4			22		6	14	16	52			33	31	
Cairo	C	1										1	3	3		3	2			1
Dakahliya Province	C											1		10	25			4	3	
Damietta	C	1																		
Faiyum Province	C			1																
Gharbiya Province	C	2		1						6		40	26	36	16			49	37	
Girga Province	C			1								1								
Minufiya Province	C	1												26	4			9	2	
Port Said	C	1																		
Qena Province	C			1										2	1			1		
Sharkiya Province	C											1	1					1	11	
Suez	C			1																
Provinces	C	18	14	26	13	9	4	15	49	35		54	44		103	126	98	86	153	133
Greece (see also table below): Salonika	C			1	1	1	1	1	1		1	1	1	2	2	2	2	6		
Guatemala. (See table below.)																				
Hawaii Territory—Honolulu	C		6	1	1														1	4
Hungary	C									3										7
Iran	C	21	5	7		1	1		2	4	5	6	3			4	2			
Teheran	C	3	2						1									1		
Iraq	C					17				19										
Basra liwa	C	1																		
Irish Free State: Waterford County: Youghal District No. 2	C			1																
Japan	C									1										
Lithuania	C	3		19					12		[2] 57			9				6		

[1] A report dated Jan. 20, 1936, states that there were 305 cases of typhus fever with 58 deaths in Santiago Province, Chile, from Nov. 2–16, 1935.
[2] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 1-28, 1935	Sept. 29-Oct. 26, 1935	Oct. 27-Nov. 30, 1935	Week ended— December 1935: 7	14	21	28	January 1936: 4	11	18	25	February 1936: 1	8	15	22	29	March 1936: 7	14	21
Mexico																				
Mexico, D. F.	C	184	50	60	16	24	28		9	26			12	14	21		24			
San Luis Potosi	D																1			
Torreon	D	2																		
Morocco (see also table below)	C	3	1	8	1	8		3	2	2	2	33	7	11	1	9	9			3
Palestine: Haifa	C	[2] 11	8	11					[2] 2			1		1	1					
Panama Canal Zone. (See table below.)																				
Peru. (See table below.)																				
Poland	C	56	109	159	59	63	73	35	55	96	100	131	101	153	121	150	146	126	158	
	D	2	4	8	5	6	6	5	6	6	6	6	16	7	6	11	8	6	6	
Portugal (see table below): Oporto	C																		1	
Rumania. (See table below.)																				
Straits Settlements: Singapore	C	1	1	1	1			1	1	1	1									
Syria: Beirut	C															[2] 2				
Trans-Jordan	C	2	2								3	3	5	4	1		1	2		
Tunisia:																				
Tunis	C	4	2	1	1						3	2							3	1
Provinces	C	18	13	6	4		20	7	12	34	10	5	20	4	9	22	9	14	30	45
Turkey. (See table below.)																				
Union of Soviet Socialist Republics. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: S. S. *Agamemnon* at London	C	1																		

[2] Imported.

Place		September 1935	October 1935	November 1935	December 1935	January 1936	February 1936
Bolivia	C	140	88	134	168	135	------
China: Manchuria—Harbin	C	------	1	3	------	1	------
Chosen	C	17	20	30	50	51	------
Czechoslovakia	C	1	12	------	------	------	35
Greece	C	4	6	4	9	5	------
Guatemala	C	43	18	26	7	9	17
Morocco	C	3	8	------	13	45	30
Panama Canal Zone	C	------	5	1	1	------	------
Peru	C	41	16	------	------	------	------
Portugal	C	3	2	------	------	------	------
Rumania	C	26	37	92	210	572	------
Turkey	C	10	13	18	35	33	------
Istanbul	C	------	------	------	------	5	------
Union of Soviet Socialist Republics	C	2,205	------	------	------	------	------
Union of South Africa:							
Cape Province	C	55	66	79	76	36	------
Natal	C	------	------	6	1	7	------
Orange Free State	C	10	23	18	4	17	------
Transvaal	C	2	2	25	12	1	------
Yugoslavia	C	11	6	10	------	131	80

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Sept. 1–28, 1935	Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Week ended— December 1935				January 1936				February 1936					March 1936		
					7	14	21	28	4	11	18	25	1	8	15	22	29	7	14	21
Brazil: [1]																				
Bahia State	C							1	2											
Matto Grosso State	C							1			1		1				1			
Minas Geraes State [1]	C						2	8	3	2	3		2	3	4		1			
	D						2	3	3	2	3		2	3	4		1			
Para State	C		1																	
Parana State [1]	C														1	4	4	1	3	1
Sao Paulo State [1]	C						2	9	2		3			2	2	3	12	1	2	
Colombia:																				
Boyaca Department	C															3				
Intendencia of Meta	C	1														3				
Acacias	C			2																
Restrepo	C			2																
Gold Coast:																				
Bawku	C		3																	
Kumasi [2]	C																1			
Preprawase. [3]																				
Tamale	C	1																		
Ivory Coast:																				
Abidjan	C			1			1													
Sassandra	C			1																1
Vavua. [4]																				
Senegal:																				
Dakar	C						[5] 1													
M'Bake	C						1													
Sudan (French): Koutiala	C		1	1																

[1] In addition to the above figures, yellow fever has also been reported in Brazil as follows: Week ended Mar. 28, 1936, 1 case and 1 death at Minas Geraes State; Feb. 16–25, 1936, 5 cases and 5 deaths and Mar. 3–11, 1936, 4 cases and 4 deaths at Parana State; Feb 26–Mar. 3, 1936, 2 cases and 2 deaths and with no date given, 2 cases and 2 deaths at Sao Paulo State.

[2] During the week ended Mar. 28, 1936, 1 case of yellow fever was reported at Kumasi, Gold Coast.

[3] During the week ended Apr. 11, 1936, 1 case of yellow fever was reported at Preprawase, near Nsawam, Gold Coast.

[4] During the week ended Apr. 4, 1936, 1 case of yellow fever with 1 death was reported at Vavua, Ivory Coast.

[5] Suspected.

UNITED STATES TREASURY DEPARTMENT

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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MORTALITY IN CERTAIN STATES DURING 1935 WITH COMPARATIVE DATA FOR RECENT YEARS[1]

This report presents mortality data for 26 States, the District of Columbia, and Hawaii for the calendar year 1935. In addition to the death rate from all causes, rates are shown for 16 specific causes and for infant and maternal mortality.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of some lack of uniformity in the method of classifying deaths according to cause, some delayed death certificates, and various other reasons, these preliminary rates cannot be expected to agree in all instances with final rates published by the Bureau of the Census. The final figures are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve as a current index of mortality until final figures are available.

The populations used for 1931–34 are the official estimates as published by the Bureau of the Census. These estimates for at least 1934 are corrected to agree with the population of the United States as computed from births, deaths, immigration, and emigration since the 1930 Census. Since no estimates have been prepared for States for 1935, the figures used represent an extrapolation from the 1934 estimates with an annual increment of approximately that used by the census in the years 1930–34.

Much has been said about the inaccuracy of population estimates for current and depression years because of population shifts and other factors. One of the largest movements has been from city to farm, and so the population estimates for cities are particularly unreliable. Estimates for whole States such as used in this report are likely to be less in error because urban-rural shifts do not necessarily mean interstate shifts. It is believed that the populations used in computing rates for this report are sufficiently reliable for the purpose at hand, namely, the comparison of the trend of mortality from year to year in the various States; the comparison of the actual rates for one State with those for others should be reserved for final figures in which the causes of death are classified in a uniform manner for all States.

---

[1] From the Office of Statistical Investigations, U. S. Public Health Service.

For purposes of comparison, the mortality rates for a few preceding years are given. These comparative rates are based on records from the same sources as those for the current reports. Although final mortality figures are often available for earlier years, the provisional figures are retained as being more comparable with current preliminary rates.

In table 1 the death rates for important causes for groups of States have been brought together. The majority of the rates are based on data from 26 States, with a population of about 85 million. The discussion which follows is based largely on the rates for States summarized in table 1, namely, those with data for the given cause for the whole 5-year period included in the report. While the rates in this group of States may not be the same as those for the total of all States, it is probable that the trend of the rates in these States will be comparable with the trend in the country as a whole.

Table 2 is a summary of death rates by quarters; the detailed tables 3 and 4 show rates for the year as a whole for each State, including some with data for only a part of the 5-year period.

The death rate from all causes in the group of 25 States with data for all 5 years was 10.8 per 1,000 in 1935, as compared with 10.9, 10.6, 10.7, and 11.0 in 1934, 1933, 1932, and 1931, respectively. In 12 of the 25 States the rate in 1935 was less than in 1934, in 9 it was higher, and in 4 States it was the same in the 2 years. In the 23 States with data available by quarters, the rate per 1,000 (annual basis) for the first quarter was 12.0 as compared with 11.9 in 1934; for the second, 11.0 as compared with 11.1; for the third, 9.6 as compared with 10.0; and for the fourth quarter the rate was 10.9 in both 1935 and 1934. In three of the four quarters the rates are almost the same in the 2 years. On the whole, the 1935 rate cannot be said to represent much change from that for 1934.

Infant mortality was somewhat lower in 1935 than in any of the 3 preceding years—52 per 1,000 live births as compared with 58 in 1934 and 56 in each of the years 1933 and 1932. The rate in 1935 decreased from that in 1934 in 21 and increased in the other 3 of the 24 States.

The tuberculosis death rate continued its uninterrupted decline, being 52.5 per 100,000 in 1935, as compared with 54.5, 56.5, and 60.2 for 1934, 1933, and 1932, respectively. Of the 26 States on which these rates are based, 16 showed a decline, 8 an increase, and 2 remained the same in 1935 as in 1934.

The minor epidemic of influenza that occurred in the first quarter of 1935 has been described in some detail in the Public Health Reports.[3] As compared with 1934, which was exceptionally free from

[3] Influenza and Pneumonia Mortality in a Group of About 95 Cities in the United States During Four Minor Epidemics, 1930-35, With a Summary for 1920-35. By Selwyn D. Collins and Mary Gover. Public Health Reports, Nov. 29, 1935 (Reprint No. 1720).

influenza, this very small epidemic was sufficient to account for a widespread but small increase in influenza and pneumonia mortality. In the group of 26 States the influenza death rate in 1935 was 19.2 per 100,000, as compared with 15 0, 22.8, and 25 2 in 1934, 1933, and 1932, respectively. In all except 1 of the 26 States, the rate for 1935 was above that for 1934, and in that State the rate was the same in the 2 years. The pneumonia death rate for 1935 was 80.1 per 100,000, as compared with 78.7, 69 0, and 75 7 in 1934, 1933, and 1932, respectively. Of the 26 States, the pneumonia rate was higher in 17 and lower in 9 States in 1935 than in 1934.

Because of the tendency toward alternately high and low rates from the common communicable diseases of children, year-to-year comparisons do not tell much about the real trend of these diseases. Measles and whooping-cough rates returned to more normal levels after the exceptionally high rates of 1934, but the rate for measles was still above the rates for both 1933 and 1932, and the whooping-cough rate was above that for 1933. The death rates for scarlet fever, diphtheria, and poliomyelitis were approximately the same as in 1934, with about half of the States showing slight increases and the other half showing decreases from the 1934 rates.

Meningococcus meningitis was higher than in any of the 3 preceding years—2.0 per 100,000 as compared with 0.8, 1.1, and 1.3 in 1934, 1933, and 1932, respectively. In 25 of the 26 States the rate was higher in 1935 than in 1934, and in the other State it was the same in the 2 years. In the last preceding period of high meningitis rates, the peaks in the various States came in 1929 and 1930.

Typhoid fever decreased to 1.9 per 100,000 in 1935 as compared with 2.3 in 1934 and 2.5 in 1933. In 20 of the 26 States the rate was lower in 1935 than in 1934. Deaths among children under 2 years of age from diarrhea and enteritis amounted to 7.6 per 100,000 total population, as compared with 10.7, 9.4, and 9.4 in 1934, 1933, and 1932, respectively. In 24 of the 25 States the rate decreased in 1935 as compared with 1934.

The death rate from diabetes was approximately the same in 1935 and 1934 (23.3 and 23.2, respectively), but in both years the rates were above those for 1933 and 1932.

Cancer continued its steady increase, the rate of 111 per 100,000 in 1935 being greater than in any other year included; 18 of the 26 States increased in 1935 as compared with 1934.

Diseases of the heart continued an upward trend, with a rate of 255 for 1935 as compared with 250, 231, and 224 for 1934, 1933, and 1932, respectively; 20 of the 24 States increased in 1935 over 1934.

Nephritis was lower in 1935 than in the preceding year, 82 per 100,000, as compared with 85. In 19 of the 25 States, the 1935 rate was less than that for 1934.

The rate for cerebral hemorrhage was almost the same as the rates in the 3 preceding years. Of 22 States with available data, 13 showed increases and 9 decreases in 1935 as compared with 1934.

TABLE 1.—*Summary of mortality from certain causes in a group of States, 1931–35* [1]

Diseases (numbers in parentheses are from the International List of Causes of Death, fourth revision, 1929)	1935	1934	1933	1932	1931
	Death rate per 1,000 population				
25 States (population July 1, 1935, 83,358,000):					
All causes	10.8	10.9	10.6	10.7	11.0
	Deaths under 1 year per 1,000 live births				
24 States (live births 1935, 1,299,048):					
Total infant mortality	52	58	56	56	60
18 States (live births 1935, 1,021,952):					
All infant mortality except malformations and early infancy	21	24	23	24	28
	Deaths of mothers per 1,000 live births				
24 States (live births 1935, 1,299,048):					
Maternal mortality	5.8	5.5	5.6	5.9	6.2
	Death rate per 100,000 population				
26 States (population July 1, 1935, 85,111,000):					
Typhoid fever (1, 2)	1.9	2.3	2.5	3.0	3.5
Measles (7)	2.7	4.3	1.7	1.4	2.4
Whooping cough (9)	3.4	5.1	3.1	3.9	3.6
Scarlet fever (8)	2.0	1.9	1.9	1.9	2.0
Diphtheria (10)	2.3	2.4	2.7	3.5	4.0
Acute anterior poliomyelitis (16)	.8	.6	.6	.7	2.0
Meningococcus meningitis (18)	2.0	.8	1.1	1.3	2.1
Influenza (11)	19.2	15.0	22.8	25.2	23.3
Pneumonia, all forms (107-109)	80.1	78.7	69.0	75.7	80.1
Tuberculosis, all forms (23-32)	52.5	54.5	56.5	60.2	64.5
Cancer (45-53)	110.8	108.6	104.7	102.3	99.9
Diabetes mellitus (59)	23.3	23.2	21.9	22.2	20.6
25 States (population July 1, 1935, 83,358,000):					
Diarrhea and enteritis under 2 years (119)	7.6	10.7	9.4	9.4	13.1
25 States (population July 1, 1935, 81,780,000):					
Nephritis, all forms (130-132)	82.2	84.6	81.8	85.3	85.0
24 States (population July 1, 1935, 80,027,000):					
Diseases of the heart (90-95)	254.9	249.6	230.8	223.9	216.7
22 States (population July 1, 1935, 65,132,000):					
Cerebral hemorrhage, apoplexy (82, a, b)	85.1	84.1	83.1	84.3	83.7

[1] See tables 3 and 4 for names of States included for each disease. The District of Columbia is counted as a State.

TABLE 2.—*Mortality from certain causes in each quarter of 1935, 1934, 1933, and 1932 in the 23* [1] *States with available data*

[Estimated population July 1, 1935: 77,959,000]

Period	All causes, rate per 1,000 population	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (16)	Lethargic encephalitis (17)	Meningococcus meningitis (18)	Tuberculosis, all forms (23-32)	Cancer, all forms (45-53)	Diabetes mellitus (59)	Diseases of the nervous system (78-89)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the circulatory system (90-103)	Diseases of the heart (90-95)	Diseases of the respiratory system (104-114)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130-132)
January-December:																									
1935	10.9	52	21	5.2	1.7	2.8	2.1	3.0	2.1	17.6	0.7	0.6	2.1	52.3	116.2	24.5	104.8	86.0	285.6	258.9	91.6	79.8	66.3	6.9	80.4
1934	11.0	56	24	5.4	2.2	3.6	2.0	4.1	2.2	13.9	.6	.6	.8	53.9	113.9	24.3	100.3	84.8	284.2	258.7	89.4	77.7	70.4	9.7	84.1
1933	10.7	55	22	5.5	2.2	1.5	2.0	2.7	2.4	22.7	.6	.8	1.1	56.1	109.8	23.3	101.4	83.7	267.5	234.4	83.3	71.2	68.3	8.7	82.2
1932	10.9	56	23	5.8	2.6	1.3	2.1	3.7	3.3	26.8	.7	.7	1.4	59.7	107.4	23.3	103.0	85.0	261.7	227.5	91.0	77.9	68.3	9.0	84.9
January-March:																									
1935	12.0	62	30	5.9	.8	4.5	3.0	3.4	2.2	41.4	.2	.6	2.3	55.4	112.9	27.4	112.8	92.1	316.3	286.9	137.3	123.6	64.3	4.2	87.5
1934	11.9	63	29	6.0	.9	5.4	3.1	3.9	2.3	25.7	.3	.6	1.0	57.1	110.8	27.3	110.6	92.0	321.4	285.6	133.7	118.7	64.1	5.7	92.9
1933	11.9	65	30	6.2	1.1	1.8	3.0	2.6	2.4	61.7	.2	.7	1.6	59.6	108.4	27.0	112.6	93.1	296.0	259.6	125.5	111.4	61.1	5.4	89.1
1932	11.9	60	26	6.3	1.7	1.8	3.1	4.5	4.2	41.7	.5	.8	2.1	64.5	105.7	26.1	111.9	92.9	289.1	251.6	131.5	116.5	64.0	5.4	93.9
April-June:																									
1935	11.0	53	22	5.4	1.1	5.7	2.8	4.5	1.4	13.4	.3	.7	2.8	56.0	117.2	23.7	106.6	85.6	287.3	261.1	94.2	81.0	67.6	7.4	82.4
1934	11.1	58	25	6.1	1.7	7.0	2.3	5.1	1.4	11.5	.6	.5	1.0	57.2	115.2	24.5	101.4	84.6	285.0	254.3	91.5	78.5	70.5	8.3	86.1
1933	10.5	53	20	5.8	1.5	3.2	2.4	2.7	1.3	11.7	.4	.7	1.2	60.1	109.3	22.8	103.0	84.1	263.4	229.7	73.0	60.8	68.0	8.0	83.5
1932	10.8	58	24	6.2	1.6	2.7	2.7	4.3	2.4	23.0	.4	.6	1.5	65.0	106.8	22.9	104.5	84.4	262.0	227.9	85.0	72.7	67.6	8.0	86.3
July-September:																									
1935	9.6	43	15	4.7	3.1	.7	.9	2.4	1.5	4.3	1.7	.5	1.4	48.9	115.3	21.4	92.2	76.1	245.3	221.8	45.6	36.4	69.4	9.9	70.9
1934	10.0	51	20	4.9	3.8	1.3	.8	4.6	1.4	4.2	1.1	.8	.6	50.4	113.4	21.0	89.1	76.0	242.8	218.3	44.2	36.0	78.8	15.5	76.9
1933	9.4	48	17	5.2	3.7	.5	.8	3.2	1.5	4.5	1.2	1.1	.6	52.5	109.4	19.9	88.1	72.0	227.7	198.7	42.3	33.4	75.6	12.9	72.7
1932	9.4	49	18	5.6	4.3	.4	.7	3.4	2.1	5.1	1.3	.7	.8	54.7	106.4	18.9	88.8	73.5	218.4	188.2	42.5	33.4	76.6	14.5	73.9
October-December:																									
1935	10.9	49	19	4.9	1.8	.3	1.8	1.7	3.3	11.9	.7	.5	1.7	49.0	119.3	25.4	107.7	90.3	294.4	266.4	90.3	79.2	63.7	6.0	78.3
1934	10.9	54	24	4.7	2.3	.9	1.8	3.1	3.5	14.2	.5	.6	.8	51.2	116.0	24.6	100.6	86.6	288.5	257.5	89.3	78.3	67.9	9.4	81.8
1933	10.9	54	22	4.9	2.5	.8	2.0	2.4	4.5	13.6	.6	.9	.8	52.1	111.9	23.5	102.1	85.7	283.5	250.1	93.1	80.1	68.3	8.5	83.6
1932	11.4	58	25	5.3	2.6	.5	1.7	2.4	4.6	37.6	.7	.7	1.0	54.7	110.7	25.2	106.9	89.3	277.5	242.8	105.4	80.2	65.0	7.9	85.4

[1] Includes all States for which data are available by quarters for the 4 years covered. For a few causes 1 to 3 States were omitted because of missing data. The States are California, Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Montana, Nebraska, New Jersey, New York, Pennsylvania, Rhode Island, South Dakota, Tennessee, Virginia, and Wisconsin.

TABLE 3.—*Mortality in certain States, 1931–35*

State	Deaths, all causes, per 1,000 population					Maternal mortality, per 1,000 live births				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total [1]	10.8	10.9	10.6	10.7	11.0	5.8	5.5	5.6	5.9	6.2
California	11.6	11.1	11.2	10.9	11.3	4.7	4.4	4.8	5.8	6.3
Connecticut	10.1	10.2	10.1	10.1	10.4	4.3	5.3	6.0	5.7	6.8
District of Columbia	17.0	16.5	15.9	16.1	15.9	6.1	3.6	4.8	7.9	6.1
Georgia	11.4	11.8	10.4	10.9	11.1	7.2	7.4	7.7	9.5	10.0
Idaho	10.8	10.6	9.6	9.2	9.6	6.2	5.8	4.4	4.4	4.5
Illinois	10.8	11.1	10.5	10.5	11.1	4.7	5.2	5.0	5.1	5.4
Indiana	11.4	12.3	11.6	11.8	11.9	5.2	5.3	5.4	4.9	5.6
Iowa	10.5	10.6	10.2	10.2	10.3	5.4	5.6	4.9	4.4	4.1
Kansas	10.7	10.5	10.4	10.1	10.0	5.3	5.5	4.8	5.4	5.8
Louisiana	10.8	10.6	10.6	10.6	10.9	8.0	8.1	8.1	8.2	8.9
Maryland	12.3	12.3	12.2	12.5	13.2	5.0	5.1	4.9	4.6	6.0
Michigan	9.9	9.9	9.6	9.7	9.8	4.9	5.3	5.5	5.7	5.9
Minnesota	9.9	10.1	9.6	9.6	9.6	4.9	4.8	4.5	4.1	4.6
Mississippi	9.5	9.9	10.4	9.9	10.8	-----	-----	-----	-----	-----
Montana	11.7	10.4	9.7	9.7	9.7	4.6	5.7	5.8	5.7	7.0
Nebraska	9.4	9.5	9.2	9.2	9.1	5.7	5.5	4.2	5.0	5.1
New Jersey	10.1	10.3	10.4	10.1	10.6	4.5	5.4	5.1	5.7	5.9
New York	11.2	11.4	11.2	11.3	11.6	5.1	5.2	6.8	6.1	5.9
North Carolina	10.1	10.7	9.3	9.4	10.2	6.6	6.9	6.4	6.8	7.8
Pennsylvania	10.8	10.8	10.6	10.9	11.3	4.9	5.2	5.1	5.4	5.7
Rhode Island	10.9	10.7	11.1	11.5	11.4	4.3	5.7	5.6	5.7	5.5
South Carolina	-----	-----	-----	-----	-----	9.6	9.2	-----	-----	-----
South Dakota	8.9	9.3	8.8	8.2	8.6	5.5	4.5	4.1	3.7	4.9
Tennessee	10.9	10.9	10.2	10.7	10.7	6.9	6.3	6.1	6.6	6.8
Virginia	11.7	11.6	10.8	10.9	11.6	5.3	5.7	5.6	6.6	7.4
Washington	11.3	10.9	-----	-----	-----	5.2	4.7	-----	-----	-----
Wisconsin	10.1	10.0	9.8	10.0	10.1	3.7	4.2	4.7	4.8	4.8
Hawaii	7.8	8.8	9.6	9.7	9.8	4.3	5.4	5.8	-----	-----
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	8.4	8.5	8.6	8.6	8.8	-----	-----	-----	-----	-----

State	Infant mortality rate per 1,000 live births									
	Total infant mortality					All except malformations and early infancy				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total [2]	52	58	56	56	60	21	24	23	24	28
California	50	52	53	53	57	20	22	24	23	26
Connecticut	39	50	48	48	54	-----	-----	-----	-----	-----
District of Columbia	59	64	65	73	71	25	32	27	33	35
Georgia	69	80	68	65	69	-----	-----	-----	-----	-----
Idaho	51	50	47	58	59	20	18	14	32	27
Illinois	46	58	51	52	56	17	24	20	21	25
Indiana	54	56	53	55	57	23	27	24	26	28
Iowa	47	53	50	48	51	19	21	19	20	22
Kansas	49	48	53	48	48	21	19	23	18	19
Louisiana	68	70	71	66	68	37	40	39	36	40
Maryland	62	69	65	70	79	30	33	31	35	45
Michigan	47	52	51	54	56	17	19	18	22	22
Minnesota	46	49	50	43	47	17	18	20	15	17
Montana	56	52	49	49	56	-----	-----	-----	-----	-----
Nebraska	42	46	51	43	47	16	16	19	15	19
New Jersey	47	49	46	52	57	-----	-----	-----	-----	-----
New York	48	52	54	53	57	19	21	22	22	33
North Carolina	67	77	66	67	73	-----	-----	-----	-----	-----
Pennsylvania	50	54	52	59	65	23	26	24	31	34
Rhode Island	47	54	56	57	61	16	18	17	23	22
South Carolina	80	87	-----	-----	-----	-----	-----	-----	-----	-----
South Dakota	50	59	55	51	58	24	27	25	23	28
Tennessee	64	75	71	69	70	39	47	44	42	44
Virginia	64	68	63	66	72	-----	-----	-----	-----	-----
Washington	45	-----	-----	-----	-----	15	-----	-----	-----	-----
Wisconsin	47	50	49	51	53	17	19	17	19	20
Hawaii	67	75	72	76	75	37	48	44	-----	-----

[1] All causes includes 25 States; maternal mortality 24 States. States not having data for all 5 years are not included in the totals.

[2] Infant mortality includes 24 States; all except malformations and early infancy, 18 States.

TABLE 4.—*Death rates for various causes per 100,000 population*

State	Typhoid fever (1, 2)					Diarrhea and enteritis under 2 years (119)				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total [1]	1.9	2.3	2.5	3.0	3.5	7.6	10.7	9.4	9.4	13.1
California	1.3	1.4	1.5	1.3	1.6	7.1	9.1	8.4	8.2	11.5
Connecticut	.8	.4	.5	.5	1.0	1.7	5.1	4.7	4.2	7.8
District of Columbia	3.2	1.6	3 6	1.4	3.9	11.8	14.3	11.5	16.0	16.7
Georgia	8.8	10.6	8.4	12.6	16.7	17.1	22.1	16.7	13.2	18.8
Idaho	2.7	5.6	4.5	3.3	3.6	2.7	11.6	6.9	4.5	4.7
Illinois	1.1	1.7	1.4	1.7	1.5	4.4	8.3	6.4	6.9	3.9
Indiana	1.6	3.1	2.9	2.6	2.9	6.5	12.2	11.1	12.3	13.9
Iowa	1.3	2.2	1.0	1.7	1.4	4.0	6.9	4.0	4.5	7.6
Kansas	1.6	1.4	1.5	1.7	2.2	6.4	8.2	8.5	7.2	8.1
Louisiana	8.9	9.5	11.4	10.8	14.5	17.1	21.1	19.1	14.0	22.4
Maryland	2.6	2.4	2.2	3.1	5.4	13.5	17.3	15.1	19.6	31.3
Michigan	.6	1.4	1.0	1.1	1.4	4.2	7.5	5.8	6.3	9.3
Minnesota	.6	.5	.8	.7	.6	3.8	4.0	5.0	3.9	4.4
Mississippi	2.5	3.0	6.0	6.3	9.5	11.1	19.7	15.1	10.9	14.4
Montana	2.4	3.0	2.8	2.8	2.2	8.0	13 2	5.4	7.4	11.0
Nebraska	.4	1.1	.7	1.4	1.7	3.6	5.4	4.7	4.9	7.1
New Jersey	.6	.9	1.0	.7	1.0	3.4	5.3	4.3	5.6	9.1
New York	.5	.6	.9	1.0	1.1	5.6	6.4	6.8	6.4	8.7
North Carolina	2.4	2.7	3.9	5.0	5 1	22.6	27.2	21.0	16.8	22.2
Pennsylvania	.8	1.1	1.2	1.8	2.1	5.6	8.3	8.6	12.3	17.5
Rhode Island	.3	.7	.4	.3	1.0	5.1	4.0	4.2	8.0	8.6
South Carolina	10.8	8.9	10 5	14.7	16 6	7.6	------	------	------	------
South Dakota	1.4	2.3	5.0	1.4	2.7	7.6	9 2	8.1	6.4	11.4
Tennessee	6.7	7.5	9.1	11.0	10.7	19.8	26.4	24.0	20.4	23.4
Virginia	3.0	3.4	4.4	5.1	7.3	11.7	17.3	16 1	14.8	22.5
Washington	1.0	1.7	------	------	------	3.7	2.0	------	------	------
Wisconsin	.8	.6	.5	.7	.7	4.4	6 6	6.6	6.8	10.4
Hawaii	2.3	3.3	5.3	2 .4	2 6	18.5	28.9	36.5	45.7	49.3
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	1.1	1.5	1.6	1.7	2.4	5.8	8 1	7.5	8.1	12.2

State	Measles (7)					Whooping cough (9)				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total (26 States)	2.7	4.3	1.7	1.4	2.4	3.4	5.1	3 1	3.9	3.6
California	1.0	1.3	1.8	.9	1.9	1.0	2.7	3.2	2.9	2.4
Connecticut	1.9	.4	.5	1.1	2.3	1.2	1.0	1.6	2.7	2.7
District of Columbia	(2)	9.7	.8	.2	2.4	.6	7.8	1.4	4.0	5.7
Georgia	.9	18.1	2.1	.5	2 1	5.1	11 2	7.3	3.8	3.8
Idaho	2 2	3 6	.7	.2	1.8	7.4	3 3	.2	.7	6.3
Illinois	3 7	2.7	.7	.6	4 2	2.6	3 9	1 0	2.9	2.7
Indiana	2 7	6.8	.4	.4	4.5	4.0	5 7	2.1	5.0	4.3
Iowa	6 1	2.7	.2	.2	.1	1.7	3 8	2.6	2.0	2.4
Kansas	11.8	1 9	.7	1 3	.4	2.8	4.7	3 2	2.5	1.3
Louisiana	5.8	7.6	1.7	1.7	.6	3.0	10.2	5.6	4.0	5.4
Maryland	1.4	8.8	.2	1.1	5.9	2 5	7.3	4.9	5.4	7.6
Michigan	3.6	.7	2.2	3.6	.6	2 5	2 8	3 0	3.9	3.7
Minnesota	2.4	1.5	2.7	.5	.3	2.4	4 2	2.9	1.7	2.1
Mississippi	1.0	13.9	2.7	.1	.4	5 0	14 4	10.1	4.9	3.4
Montana	9.1	5.4	2.6	2.2	.4	4.3	4.7	3.0	4.1	3.9
Nebraska	6.1	1.6	.6	.1	.3	1.2	5.9	2 0	1.9	4.0
New Jersey	1.3	1.2	1.7	1.0	2.4	2.3	1.5	1.0	2.9	3.3
New York	1.5	.6	2.5	1.6	1.8	2.5	1.7	2.2	2.3	2.9
North Carolina	2.1	9.5	2.6	1.8	3.2	9.0	13 0	6.0	6.9	5.7
Pennsylvania	2.2	2.6	1.2	2.1	4.2	2.0	3.2	1.9	4.4	3.1
Rhode Island	1.0	.4	(2)	6.0	1.4	1.1	3 0	3.6	1.6	2.3
South Carolina	1.3	13.3	3.5	2.4	2.2	9.9	16.5	6.2	7.6	5 3
South Dakota	4.0	16.6	1.0	(2)	.3	4.0	7.8	6.3	6.3	5.7
Tennessee	1.4	16.3	2.4	.3	3.8	14 1	9.6	5.7	7.5	6.3
Virginia	5.5	6.2	2.1	.9	3.2	8.1	8.3	4.4	12.5	6.2
Washington	1.5	.9	------	------	------	1.9	2.6	------	------	------
Wisconsin	2.4	2.2	.9	1.4	1.4	1.7	3.5	2.0	2.2	1.9
Hawaii	(2)	.3	.5	6.6	10.2	2.6	14.1	12.4	1.1	.3
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	2.5	2.7	1.5	1.7	3.2	2.6	3.7	2.3	3.0	3.6

[1] Typhoid fever includes 26 States; diarrhea and enteritis, 25 States.
[2] No deaths.

Table 4.—*Death rates for various causes per 100,000 population—Continued*

State	Scarlet fever (8)					Diphtheria (10)				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total (26 States)	2.0	1.9	1.9	1.9	2.0	2.3	2.4	2.7	3.5	4.0
California	1.1	1.3	1.4	.9	.9	2.1	1.7	1.9	3.3	2.9
Connecticut	1.3	.8	1.4	1.1	.7	1.0	.4	1.0	1.0	.9
District of Columbia	1.6	1.6	2.6	2.6	1.0	5.6	3.0	2.8	3.2	7.1
Georgia	.7	.5	.6	.6	1.5	5.4	6.2	6.2	5.7	5.0
Idaho	6.5	2.9	.2	1.9	2.2	.7	2.9	1.8	3.1	2.5
Illinois	5.1	2.6	3.5	3.3	4.5	2.6	1.9	1.7	3.0	4.7
Indiana	3.5	3.6	2.7	2.7	3.6	4.1	3.6	4.5	5.2	4.1
Iowa	2.8	2.5	1.8	1.5	1.6	2.1	1.6	2.1	2.3	1.7
Kansas	2.4	1.8	2.1	1.7	1.2	2.0	2.2	2.9	3.9	3.7
Louisiana	.5	.6	.5	.4	.7	5.1	4.6	4.7	6.5	6.4
Maryland	1.7	1.5	2.3	1.9	1.9	1.3	1.3	1.7	3.1	4.0
Michigan	1.9	3.4	3.1	2.2	2.3	1.1	.8	2.2	2.1	3.5
Minnesota	3.0	1.2	1.4	1.6	.9	.6	.7	1.0	.9	1.4
Mississippi	.4	.7	.4	.6	.5	4.2	4.1	5.4	6.2	9.9
Montana	3.9	2.0	1.9	1.5	1.9	2.8	1.9	3.0	.9	1.7
Nebraska	2.9	1.7	1.7	2.0	1.5	1.2	1.6	1.5	4.0	3.5
New Jersey	.6	1.5	1.4	1.7	2.0	1.1	1.3	1.2	2.3	2.9
New York	1.4	1.2	1.6	2.8	1.7	.8	1.0	1.1	2.1	2.2
North Carolina	.7	1.2	1.4	1.1	2.0	4.7	6.3	6.1	4.6	7.3
Pennsylvania	2.0	2.3	2.7	2.6	2.3	1.5	2.2	2.3	4.0	3.6
Rhode Island	.4	.6	1.3	3.5	1.7	.7	.3	1.3	4.1	4.7
South Carolina	.3	.6	.8	.5	1.0	3.5	4.5	5.2	4.9	4.9
South Dakota	2.7	1.4	1.6	1.3	.6	1.7	1.0	2.3	2.9	2.6
Tennessee	1.0	2.0	1.8	.8	2.4	6.7	7.6	8.2	8.2	9.3
Virginia	1.0	1.8	2.1	1.3	1.4	4.7	6.0	6.3	5.3	8.5
Washington	1.5	1.6	------	------	------	.7	.5	------	------	------
Wisconsin	3.6	1.8	1.2	1.5	2.1	.4	.9	.6	1.9	1.8
Hawaii	(1)	(1)	(1)	.3	(1)	.7	.5	1.8	4.8	5.7
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	2.6	2.6	2.6	2.8	3.2	2.2	2.1	2.6	3.9	4.5

State	Poliomyelitis (16)					Meningococcus meningitis (18)				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total (26 States)	0 8	0.6	0.6	0 7	2.0	2.0	0.8	1.1	1.3	2.1
California	1 1	1.8	.2	.5	.8	2.0	.8	1.3	1.4	2.5
Connecticut	1.3	.1	.2	.4	5 5	1.0	.4	.5	.7	.7
District of Columbia	2 0	.6	.4	1.2	.8	18.8	1.0	2.2	2.6	5.7
Georgia	.5	.8	.7	.9	1.2	1 0	.6	.4	.8	1.8
Idaho	.9	3.3	.9	.2	.7	4.9	2.9	1.6	3.1	6.9
Illinois	.5	.4	.4	.5	1.3	2.6	1.5	2.7	2.0	3.2
Indiana	.3	.7	.3	.2	.6	2.6	.6	1.4	3.9	5.5
Iowa	.4	.8	1.6	1 0	1.1	2.0	1.1	1.4	.9	2.6
Kansas	.5	.6	.7	.6	.6	2.1	1.1	1.1	1.3	1.3
Louisiana	.7	.4	.4	.5	.9	.8	.6	1.2	1.3	2.3
Maryland	.2	.3	.2	.3	.7	5.1	.2	1.1	1.1	1.8
Michigan	.6	.5	.1	.5	2.2	.8	.5	.6	1.3	2.4
Minnesota	.4	.8	1.3	.5	2.4	1.7	.8	1.2	.9	1.6
Mississippi	.4	.9	.3	.8	.4	1.1	.7	1.0	1.0	1.5
Montana	.2	3.2	.4	1.1	2.8	2.6	1.7	.6	1.3	2.2
Nebraska	.7	.6	.3	.9	.9	2.7	1.3	.6	.5	1.6
New Jersey	.8	.3	.6	1.1	3.5	.7	.5	.6	.8	1.8
New York	1.1	.8	1.1	.5	5.2	2.1	.6	.7	1.2	2.7
North Carolina	2 0	.4	.4	.5	.6	.8	.5	.3	.5	.6
Pennsylvania	.3	.3	.6	1.5	1.0	1.2	.7	.9	1.3	1.9
Rhode Island	3.4	(1)	.1	.4	1.4	2.3	.7	.4	.4	.9
South Carolina	.7	.7	.7	.6	.9	1.3	.7	2.0	1.4	2.1
South Dakota	1.0	1.4	.9	1.1	2.3	.4	.4	.1	.4	.3
Tennessee	.9	1.2	1.2	.6	.9	4.0	1.4	.9	1.4	4.3
Virginia	1.8	.7	.4	.7	.6	4.1	1.5	1.0	1.1	1.8
Washington	.6	3.4	------	------	------	2.2	1.0	------	------	------
Wisconsin	.2	.5	.4	.4	1.6	1.2	.7	.5	.9	1.3
Hawaii	(1)	.3	.5	8	.8	.7	2.0	.8	2.9	2.3
Industrial policyholders Metropolitan Life Insurance Co., ages 1 and over	.8	.5	.6	1.1	2.7	------	------	------	------	------

[1] No deaths.

TABLE 4.—*Death rates for various causes per 100,000 population*—Continued

State	Influenza (11)					Pneumonia, all forms (107-109)				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total (26 States)	19.2	15.0	22.8	25.2	23.3	80.1	78.7	69.0	75.7	80.1
California	8.5	5.2	13.8	18.3	13.6	61.0	54.0	61.8	64.1	66.5
Connecticut	8.6	7.4	21.5	15.3	17.3	64.9	63.9	73.6	66.0	72.3
District of Columbia	13.6	7.6	9.9	15.5	18.1	151.5	131.6	115.6	135.5	140.3
Georgia	44.8	32.9	41.5	39.0	44.1	99.8	100.5	76.3	82.9	82.9
Idaho	18.3	14.7	18.7	21.0	9.2	102.2	102.7	72.8	76.7	76.5
Illinois	15.4	10.6	15.4	24.0	20.3	76.7	74.9	63.3	67.4	69.1
Indiana	25.5	22.5	31.1	44.0	35.0	89.2	85.9	69.1	90.6	86.2
Iowa	21.4	17.9	33.3	35.8	25.7	77.6	77.0	74.1	78.9	66.8
Kansas	30.6	19.2	45.9	41.6	30.0	78.0	58.1	53.4	53.5	51.5
Louisiana	23.5	20.1	32.4	52.4	42.1	84.8	72.6	64.1	75.5	81.4
Maryland	14.3	8.7	17.4	20.1	20.6	97.4	96.5	93.6	103.0	126.3
Michigan	13.9	10.5	17.0	22.2	16.5	73.8	67.8	54.4	63.3	57.6
Minnesota	15.9	14.6	24.5	30.8	21.8	76.9	81.3	58.9	68.8	69.1
Mississippi	41.5	24.9	34.8	40.5	37.5	61.8	63.9	49.6	48.3	56.3
Montana	41.5	26.4	35.8	41.6	32.7	121.4	81.6	63.3	63.6	70.3
Nebraska	22.2	17.4	34.5	36.9	21.8	76.3	73.2	70.0	62.0	54.3
New Jersey	9.2	7.3	12.3	14.0	13.6	63.4	66.2	71.3	61.3	78.0
New York	6.7	6.7	12.9	13.0	13.4	83.6	83.9	91.4	96.7	105.6
North Carolina	29.0	21.6	28.8	20.5	33.4	92.7	102.1	64.9	80.7	87.1
Pennsylvania	18.5	15.1	25.1	29.3	28.1	81.4	79.9	69.7	81.5	97.2
Rhode Island	8.0	7.5	17.4	11.3	13.9	74.9	70.6	76.1	93.8	98.8
South Carolina	46.4	42.8	37.5	50.8	65.9	91.7	96.6	87.4	99.0	104.8
South Dakota	31.0	29.1	45.1	28.9	26.0	94.1	83.5	61.0	46.6	55.4
Tennessee	41.9	35.6	39.7	54.1	37.0	100.2	96.2	77.4	87.1	84.5
Virginia	37.9	27.0	37.1	37.3	47.2	84.7	79.1	66.6	71.5	80.6
Washington	16.4	13.8	------	------	------	57.3	54.7	------	------	------
Wisconsin	18.5	11.6	25.6	28.5	18.1	63.1	67.6	51.4	66.5	65.4
Hawaii	13.1	14.6	7.4	11.3	11.0	69.2	117.1	97.8	100.1	102.3
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	14.6	11.4	20.3	19.1	21.1	66.1	65.0	62.5	65.4	73.7

State	Tuberculosis, all forms (23-32)					Cancer (45-53)				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total (26 States)	52.5	54.5	56.5	60.2	64.5	110.8	108.6	104.7	102.3	99.9
California	72.0	74.9	76.4	81.0	88.9	134.5	129.4	127.0	120.2	124.2
Connecticut	41.8	42.5	47.2	49.0	53.6	126.0	128.0	121.4	121.5	114.0
District of Columbia	121.6	122.5	124.6	121.5	120.2	155.9	152.5	149.5	146.7	135.2
Georgia	58.1	59.2	59.9	65.5	72.9	57.1	58.7	55.0	52.2	52.7
Idaho	26.3	28.8	31.0	28.6	29.8	71.4	75.4	82.6	76.6	66.4
Illinois	51.3	52.1	53.4	54.1	59.1	126.5	122.4	117.7	114.4	112.7
Indiana	47.7	54.2	56.9	59.9	61.1	113.5	114.8	109.7	110.8	106.1
Iowa	26.1	24.9	25.7	28.2	28.5	128.6	125.9	123.0	116.5	112.9
Kansas	28.3	26.9	30.3	32.5	37.0	109.3	113.0	108.1	104.2	97.0
Louisiana	70.2	74.5	73.0	72.7	81.5	78.1	71.6	71.8	67.1	68.2
Maryland	78.4	78.1	81.5	90.4	95.7	126.1	124.3	117.5	116.0	111.6
Michigan	39.7	43.1	46.5	48.2	53.3	100.7	101.0	96.9	93.3	90.6
Minnesota	34.9	34.9	37.9	39.2	40.0	131.9	130.7	131.1	124.2	121.3
Mississippi	49.7	54.2	59.9	62.6	72.1	53.8	50.6	49.5	50.2	48.7
Montana	46.4	49.2	50.3	55.0	61.3	96.3	87.5	91.4	92.9	74.5
Nebraska	21.9	21.7	21.6	20.3	24.6	105.9	109.0	101.4	100.6	98.5
New Jersey	50.2	52.8	56.7	60.6	65.1	124.2	123.2	119.6	112.9	113.4
New York	56.1	56.1	59.1	61.3	66.4	140.2	130.6	128.1	124.1	123.8
North Carolina	58.1	63.4	64.3	65.5	69.4	51.9	51.1	50.0	46.2	48.2
Pennsylvania	45.3	47.2	48.4	52.5	56.4	109.1	106.8	102.8	102.1	98.9
Rhode Island	48.1	43.6	49.5	52.4	61.9	139.1	129.5	134.3	140.7	132.6
South Carolina	54.6	------	------	------	------	50.0	53.5	48.2	41.6	45.3
South Dakota	38.5	33.8	38.3	45.1	43.7	87.8	84.3	82.4	80.7	82.7
Tennessee	88.5	88.4	93.8	101.4	107.2	67.8	64.2	60.0	56.8	57.1
Virginia	74.3	72.9	77.3	81.0	87.0	77.5	74.5	72.8	67.9	64.8
Washington	52.0	47.8	------	------	------	133.4	129.6	------	------	------
Wisconsin	35.1	37.1	40.7	44.9	48.1	123.9	122.1	116.4	116.4	115.8
Hawaii	68.3	81.6	99.6	94.3	96.2	62.0	60.6	68.6	71.5	57.2
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	55.6	59.4	64.7	69.8	76.2	95.5	96.1	94.6	91.1	84.1

TABLE 4.—*Death rates for various causes per 100,000 population—Continued*

State	Diabetes mellitus (59)					Cerebral hemorrhage, apoplexy (82, a, b)				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total [1]	23.3	23.2	21.9	22.2	20.6	85.1	84.1	83.1	84.3	83.7
California	23.9	21.5	22.6	20.8	19.2	81.0	77.4	82.6	77.8	78.6
Connecticut	29.7	25.9	24.6	25.1	21.9	---	---	---	---	---
District of Columbia	31.1	37.8	29.5	28.2	25.1	118.4	107.6	115.2	107.5	106.7
Georgia	12.8	13.0	11.7	11.6	10.9	79.9	76.6	72.6	80.0	84.8
Idaho	12.9	13.2	10.7	12.7	12.5	70.8	71.9	74.8	79.9	95.3
Illinois	24.9	27.7	26.1	26.3	25.6	71.8	71.1	72.4	73.0	73.0
Indiana	16.0	18.7	14.6	15.5	16.4	125.8	127.2	110.8	114.1	111.2
Iowa	21.9	24.9	19.5	16.0	19.8	107.6	110.4	112.1	109.0	111.2
Kansas	21.9	23.6	23.3	22.1	21.9	97.2	96.8	99.8	101.2	94.8
Louisiana	15.4	13.8	14.0	13.7	12.8	64.8	56.0	60.6	60.2	67.5
Maryland	26.0	23.3	23.6	25.7	23.0	108.7	102.1	103.0	112.6	108.6
Michigan	23.9	21.7	21.9	21.9	19.1	81.8	84.1	81.4	84.1	87.7
Minnesota	22.3	22.7	20.7	22.2	19.5	83.2	82.4	80.2	77.8	75.4
Mississippi	10.6	8.4	7.6	7.6	7.8	59.8	64.0	65.8	61.9	64.3
Montana	19.6	19.7	15.6	15.8	15.4	92.6	75.4	69.6	70.1	68.0
Nebraska	20.0	19.9	16.8	22.8	21.2	96.9	95.8	95.0	93.0	84.4
New Jersey	28.7	27.4	29.0	26.0	23.9	76.2	80.9	82.3	77.3	79.4
New York	32.0	31.7	30.4	29.9	28.2	75.6	---	---	---	---
North Carolina	10.4	11.4	10.7	10.7	10.6	---	---	---	---	---
Pennsylvania	27.7	26.8	25.7	25.7	24.7	88.5	84.3	84.9	85.7	87.0
Rhode Island	31.4	32.0	34.0	32.0	29.4	91.8	88.5	96.9	104.9	98.0
South Carolina	12.3	11.9	8.3	11.1	10.3	100.3	---	---	---	---
South Dakota	19.2	22.1	19.6	17.3	20.6	77.2	72.8	78.2	67.0	64.1
Tennessee	12.1	11.0	10.6	10.1	10.6	81.3	78.3	66.7	65.6	60.0
Virginia	16.4	17.2	14.8	15.8	14.9	102.3	96.0	96.6	91.0	97.7
Washington	23.5	11.3	---	---	---	99.6	95.7	---	---	---
Wisconsin	24.8	24.0	23.6	22.4	22.4	85.1	85.2	85.0	87.3	85.9
Hawaii	15.0	16.6	15.8	9.5	12.3	39.7	38.9	49.7	51.8	50.7
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	24.2	24.4	24.1	23.0	21.1	61.2	63.2	63.8	62.1	60.4

State	Heart diseases (90–95)					Nephritis (130–132)				
	1935	1934	1933	1932	1931	1935	1934	1933	1932	1931
Total [2]	254.9	249.6	230.8	223.9	216.7	82.2	84.6	81.8	85.3	85.0
California	306.4	283.3	274.6	252.2	253.4	79.0	76.0	78.7	80.6	80.9
Connecticut	221.0	219.5	209.7	206.1	203.0	86.5	87.9	85.3	87.8	88.8
District of Columbia	393.6	391.3	342.2	330.6	300.2	119.8	126.2	128.9	140.4	146.2
Georgia	170.6	167.3	134.0	139.9	132.8	105.1	109.1	105.0	109.6	107.4
Idaho	170.1	158.3	161.8	161.2	159.7	37.3	36.2	35.3	43.3	38.7
Illinois	272.6	267.1	254.5	231.6	232.1	95.4	103.6	102.6	108.8	107.2
Indiana	262.5	271.2	185.8	183.2	176.8	66.8	77.4	76.1	73.2	74.8
Iowa	229.9	209.8	196.3	198.3	200.7	63.5	66.7	65.5	65.4	64.4
Kansas	213.8	203.6	194.0	178.0	153.9	90.8	94.7	93.9	100.0	95.3
Louisiana	178.6	182.5	188.0	182.5	178.0	105.1	107.9	95.9	102.5	108.6
Maryland	264.6	263.7	256.5	256.5	251.0	132.9	137.5	144.5	138.4	139.2
Michigan	241.3	230.6	226.8	217.9	204.4	57.7	60.7	59.6	57.8	58.8
Minnesota	215.2	214.2	198.3	193.6	177.9	48.7	52.0	54.8	54.7	50.8
Mississippi	106.0	95.9	97.0	84.2	94.3	88.5	83.4	69.6	76.3	95.4
Montana	203.2	177.3	178.8	158.7	139.6	77.8	70.2	68.7	71.4	66.7
Nebraska	185.1	180.5	175.9	171.4	159.1	50.3	59.3	57.3	72.0	67.9
New Jersey	286.0	285.8	269.0	231.0	234.8	79.8	82.9	86.0	91.0	96.8
New York	311.6	318.2	289.9	294.2	288.0	78.6	80.8	76.7	74.8	78.4
Pennsylvania	277.0	262.9	244.8	238.4	233.5	84.7	89.6	92.6	93.0	92.7
Rhode Island	310.0	294.3	276.8	264.7	245.8	98.2	105.8	111.9	117.2	112.5
South Carolina	189.4	---	---	---	---	97.1	108.8	---	---	---
South Dakota	186.6	143.3	145.1	150.3	127.4	59.8	61.8	50.1	41.7	39.1
Tennessee	149.7	146.6	136.3	133.6	128.1	66.3	63.2	62.4	67.2	69.6
Virginia	223.7	219.1	192.5	198.3	188.3	92.8	93.0	89.2	119.5	101.5
Washington	266.9	246.5	---	---	---	79.9	75.8	---	---	---
Wisconsin	246.9	232.1	223.7	217.4	203.1	67.5	67.6	65.7	66.5	67.7
Hawaii	100.2	98.5	115.9	160.1	105.7	67.1	65.5	77.0	60.2	68.4
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over [3]	157.4	162.9	161.5	155.5	147.9	59.9	64.9	67.1	68.7	67.6

[1] Diabetes mellitus includes 26 States; cerebral hemorrhage, apoplexy, 22 States.
[2] Heart disease includes 24 States; nephritis, 25 States.
[3] Heart diseases in data for industrial policyholders exclude pericarditis, acute endocarditis, acute myocarditis, and angina pectoris; nephritis data for industrial policyholders include only chronic nephritis.

THE SIGNIFICANCE OF INFANT MORTALITY RATES[1]

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It has been stated that infant mortality is the most sensitive index we possess of a city's health. It is to the worker in the field of health what the clinical thermometer is to the physician.[2] Since that statement was made, Holland and Palmer have shown that social and economic conditions within a city determine to some degree whether that city will have a high or low infant mortality rate.[3] Hence, condemnation or praise of the healthfulness of a city on the basis of its infant mortality rate, or any other mortality rate, without taking the environmental conditions into account, is decidedly unfair. The purpose of this paper is to investigate another limitation of the infant mortality rate as an index of a city's health.

The American Child Health Association has published annually, since 1919, a Statistical Report on Infant Mortality. This report has included all the cities of over 10,000 population from which data were available, both within and without the birth registration area. Comparisons of the infant mortality rates from year to year for the several cities have shown that the rates for smaller cities were often very erratic; one year the rate might be extremely high and the next year extremely low. Cairo, Ill., is an example of this. In the years 1928 through 1932, rates of 98, 153, 56, 127, and 62 were quoted. Over the same period the number of births reported was 276, 176, 198, 150, and 161. Where the number of births on which the rates are based is so small, one or two deaths (which may occur in any given year by chance) very materially affect the infant mortality rate. In Cairo, reporting only 161 births in 1932, one more death would have caused the rate to jump 6 points, from 62 to 68. Some of the smaller cities report considerably less than 100 births; in such cases one additional death would change the rate from a fairly low to a relatively high rate.[4] Certainly an annual index that can be made to fluctuate as much as 10 points or more by the death of one child is not a very reliable measure of a city's healthfulness.[5] Too much

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[1] From the Office of Child Hygiene Investigations, U S Public Health Service

[2] Local government board Report on infant and child mortality, by the medical officer of the board, Arthur Newsholme, M D , 1910, pp 74-83

[3] Improving the value of the infant mortality rate as an index of public health effort Dorothy E Holland, Ph D , staff associate, and George T Palmer, Dr P H , director, Division of Research, American Child Health Association *Am Jour Dis of Children* (Chicago) 36 1237-49 (December 1928).

[4] Winnetka, Ill , reported 2 births and 1 death in 1930 and 1931, making a rate of 500 Such a rate is, of course, absurd

[5] Naturally the degree of fluctuation for a particular city is relative to the variability of the rates for the several cities. In this case the standard deviation of the rates for all the cities is about 20 points.

depends on the particular year that may be chosen to represent the city.

Contrasted with these extreme fluctuations in rate for a small city, the rates for Chicago during the same period were 64, 60, 54, 57, and 49. The numbers of births were 59,017, 58,799, 58,083, 52,993, and 49,258. An additional death in 1932 would have raised the rate for that year only 0.02 of a point, a difference so insignificant that it may be disregarded. The rates for large cities are, therefore, much more stable [6] than the rates for small cities and, as such, may be considered as reflecting general characteristics of the cities. Such rates may serve as one index of the healthfulness of the cities, if they are interpreted in terms of the different social and economic conditions existing in the several cities.

In view of the extreme fluctuations in the rates for the small cities and the relatively stable character of rates for large cities, the question naturally arises, "How large must a city be to have an infant mortality rate of sufficient stability to be significant?" Since the rates are based not on the total population but on the number of live births, the question may be restated as, "What must be the size of the annual birth registration of a city in order to form an adequate base for a relatively stable infant mortality rate?" It is this problem of the critical number of births with which this paper deals.

The solution is based on the fundamental assumption that the health conditions of any given city are normally subject to very little variation from year to year, and that there are real distinctions between cities which tend to persist from one year to the next. If, for cities with small birth registration, the differences between the cities are not revealed in the infant mortality rates for successive years, then it is assumed that the rates for these cities are not sufficiently stable to be used as health indices. By classifying the cities according to the annual number of births and then determining the degree to which the rates for one year distinguish the cities in the same way as the rates for a succeeding year, we may form a judgment relative to the stability of the rates and the dependence of this stability upon the number of births occurring in the respective cities.

Following the above assumptions, the cities for which complete infant mortality data were reported to the American Child Health Association for the years 1926 through 1932 were classified according to the annual number of births. The cities were classified in accordance with a 4-year average of the number of births, 1926–29, inclusive. The number of cities in each classification is given in table 1.

[6] Throughout this paper "stable" and "stability" are used in the sense of distinguishing cities in the same way from year to year irrespective of the persistent downward trend of infant mortality.

TABLE 1.—*Classification of cities by annual number of births occurring during the period 1926–29* [1]

Annual number of births	Number of cities in each classification
5,000 and over	24
1,000 to 5,000	123
750 to 1,000	63
500 to 750	82
250 to 500	213
200 to 250	45
Less than 200	53
Total	603

[1] Only cities for which complete infant mortality rates for each of the 7 years, 1926–32, were available were included.

The degree to which the same distinctions between cities are made by the infant mortality rates for succeeding years is best revealed through the correlation of the rates of 1 year with those of the next. Such correlations for each classification of cities (table 1) have been determined for the years 1926 to 1932 (table 2).

TABLE 2.—*Correlations of the annual infant-mortality rates for successive years* [1] *(603 cities of over 10,000 population, classified according to the mean annual birth registration, 1926–29, inclusive)*

Annual birth registration	Correlation coefficient of rates for—						
	1926 with 1927	1927 with 1928	1928 with 1929	1929 with 1930	1930 with 1931	1931 with 1932	Mean
5,000 and over	.77	.82	.81	.75	.83	.75	.79
1,000 to 5,000	.72	.80	.77	.80	.67	.65	.74
750 to 1,000	.72	.77	.67	.79	.72	.73	.73
500 to 750	.63	.73	.74	.66	.76	.73	.71
250 to 500	.50	.51	.51	.54	.45	.39	.48
Less than 250	.45	.33	.29	.33	.28	.21	.31

[1] All data in this report are derived from material in Births, Stillbirths, and Infant Mortality Statistics for Birth Registration Area of the United States, 1926–29, published annually by the U S Department of Commerce, Bureau of the Census; and from Statistical Report of Infant Mortality, 1926–32, published annually by the American Child Health Association, New York, N. Y.

It is apparent from table 2 that cities registering over 500 births have much more stable rates than cities with smaller birth registration. The average correlation for each group of these cities with large birth registration is above .70. Among cities with less than 500 births the relationships are considerably lower, being .48 for cities in which there are 250–500 births and .31 for cities in which there are less than 250 births. Certainly in these last two groups of cities the correlations are too small to justify the use of their annual infant mortality rates as indices of the healthfulness of the cities.

Although the relationship between the rates for successive years in the cities with 250–500 births is low, it was thought that the division of this group into subgroups and the determination of the correlations

for the subgroups might reveal higher correlations among those groups with the larger birth registration. The correlations for the subgroups are presented in table 3.

TABLE 3.—*Correlations of the infant mortality rates of cities for successive years (cities with a birth registration of 500 or less, classified according to mean birth registration)*

Annual birth registration	Number of cities	Correlation coefficient of rates for—						
		1926 with 1927	1927 with 1928	1928 with 1929	1929 with 1930	1930 with 1931	1931 with 1932	Mean r
450 to 500	35	.70	.63	.72	.67	.62	.40	[illegible]
400 to 450	36	.49	64	.40	.61	.64	.46	.54
350 to 400	43	.48	.52	.57	.53	.48	.57	.52
300 to 350	49	.55	.62	.67	.54	.31	.27	.49
250 to 300	50	.36	.17	.29	.48	.33	.34	.33
200 to 250	45	.57	.28	.43	.52	.56	.36	.45
Less than 200 [1]	53	.29	.38	.24	.19	.02	.15	.21

[1] Since there were only 53 cities in this group, no further subdivision was attempted.

The average correlation for the group with 450–500 births is not nearly as low as the average for the entire group. It is, however, much lower than .71, the relationship that exists in the 500–750 group. It would seem, therefore, that the annual infant mortality rates for cities that have an annual birth registration of less than 500 births fluctuate too much to be useful as an index of a city's healthfulness. With proper limitations the rates for cities that have from 450–500 births annually may be used, but with less than 450 births the annual rates are too erratic to have any real value or significance.

These conclusions were checked by comparing the actual variability of the rates for the cities within any classification group with the theoretical variability that would exist if the differences in the cities' rates were due only to chance factors of sampling. The theoretical variability in proportions due to random sampling errors is given by the formula $\sqrt{pq/n}$ where p is the rate, q is $(1-p)$, and n is the base upon which the rate was computed.[7] In computing the theoretical variability for the several groupings, the average rate for the 7-year period was used as the rate and the average registration for the group was used as the base. A comparable measure of the actual variability in the rates is the standard deviation computed for the cities in each group. (The average standard deviation for the 7-year period was used.) The relative size of these two variabilities may be judged by their ratios (table 4).

[7] The limitations in the use of this formula with vital statistics data are recognized. The method is merely used here as a check on the previous conclusions.

Table 4.—*Comparison of theoretical and actual variability in infant mortality rates for cities classified by average annual number of births*

Annual birth registration	Average infant mortality rate, 1926–32 (M)[1]	Theoretical variability due to sampling errors (σ_p)[2]	Actual variability of the rates (σ_{dis})[3]	Ratio $\frac{\sigma_p}{\sigma_{dis}}$
5,000 and over	63.89	2.00	9.10	0.22
1,000 to 5,000	65.19	4.51	15.75	.29
750 to 1,000	67.21	8.46	20.35	.42
500 to 750	65.47	9.80	19.90	.50
250 to 500	63.50	12.59	19.25	.65
Less than 250	67.66	20.51	25.56	.80
450 to 500	62.78	11.13	18.17	.61
400 to 450	63.31	11.81	19.04	.62
350 to 400	65.34	12.76	19.46	.66
300 to 350	62.95	13.47	19.63	.69
250 to 300	63.10	14.66	18.90	.78
200 to 250	68.81	16.88	24.67	.68
Less than 200	66.69	20.37	25.86	.79

[1] M=Average infant mortality score for all cities in the group for all years included in the investigation

[2] $\sigma_p = \sqrt{\dfrac{M\times(1000-M)}{\text{Average number of births in each classification}}}$

[3] $\sigma_{dis} = \dfrac{\sum_{1926}^{1932}\sqrt{\dfrac{\Sigma(\text{rates})^2}{N}-(M\text{ rate})^2}}{7}$

The conclusions drawn from tables 2 and 3 are completely verified by these data. Among the cities with less than 500 births, the variability due to chance accounts for two-thirds or more of the actual difference between the rates, whereas in the other groups less than half of the variability may be ascribed to chance. Hence annual rates for these smaller cities do not reveal reliably the distinctions between cities.

The fact that annual rates for cities with less than 500 births are too fluctuating to be indicative of differences between the cities does not preclude the use of infant mortality data for these cities. There is no real reason, other than that of custom, why the time basis for computing these rates should be restricted to a year. The value of this time unit in the matter of convenience cannot be denied; but a period of 1 year is not of sufficient duration to produce stable rates for the small cities. Accordingly, the degree to which rates tend to become stable when based on 2-year periods was investigated. The method already described was used and the correlations are presented in table 5.

Table 5.—*Correlations of the biennial infant mortality rates for successive 2-year periods (311 cities with annual birth registration of 500 or less)*

Annual birth registration	Correlation coefficients of rates for—				
	1926–27 with 1928–29	1927–28 with 1929–30	1928–29 with 1930–31	1929–30 with 1931–32	Mean r
250–300	.70	.65	.63	.62	.65
200–250	.58	.70	.65	.65	.64
Less than 200	.50	.32	[illegible]	.26	.33

A comparison of the average correlations between annual rates (tables 2 and 3) and the average correlations between biennial rates for the same groups of cities (table 5) shows that the extension of the time period does increase the stability of the rates. The average correlation between the 2-year rates for cities with birth registrations of 250–500 is raised from .48 to .65, and for cities with birth registrations of 200 to 250, the increase is from .45 to .64. Although these correlations are not quite as high as those obtained between annual rates for cities with 500–750 birth registrations, they may be used, if their tendency to fluctuate is recognized.

The increase in correlation from .21 to .33 for the cities with less than 200 registered births is not sufficient to justify attaching any significance to the rates for these cities. Therefore correlations of rates based on 3-year data for these cities were studied. The correlation between rates based on data for 1926, 1927, and 1928 for these cities and rates based on data for 1929, 1930, and 1931 was .40, and the correlation between rates on 1927, 1928, and 1929 data and rates on 1930, 1931, and 1932 data was .30. The average is only .35. Even rates based on 3-year data do not give sufficiently stable rates to reveal whatever distinctions there may be between these smaller cities. The use of 3-year rates instead of 1- or 2-year rates increased the correlation to such a small degree, further combinations of data hardly seemed worth while. The infant mortality rates for these cities are therefore of doubtful significance.

SUMMARY

Infant mortality rates for cities with small birth registrations fluctuate to such an extent from year to year that they are of little value as an index of the relative health conditions within the several cities. This paper reports an investigation of the number of births that must be registered in order that the infant mortality rate may be sufficiently stable to be indicative of the real differences in the healthfulness of cities.

As a basis for solution, it is assumed that differences between cities affecting the infant mortality rate tend to persist from year to year. Then, if the relative sizes of the infant mortality rates do not consistently distinguish the cities in the same way from one year to the next, the infant mortality rate is not useful as an index of the differences between the cities. The degree to which the differences in the infant mortality rates of cities tend to persist through successive years was investigated for cities of different numbers of registered births.

CONCLUSIONS

1. Annual infant mortality rates for cities with less than 450 registered births fluctuate too much from one year to the next to be of

any real significance as an index of conditions within a city. Annual rates for cities having 450–500 registered births may be used, but they, too, are somewhat unreliable.

2. Rates computed on the basis of 2-year data for cities with an annual registration of 200 to 450 births, though not as reliable as annual rates for the larger cities, are sufficiently stable to be used with proper recognition of their limitations.

3. Infant mortality rates for cities with an annual birth registration of less than 200 births fluctuate too much from year to year to be of any value as indices of the differences between the several cities.

4. A methodology is suggested which may be useful in the study of the reliability of other vital statistics rates that have a small number of cases as their base.

CHOICE OF RAT POISON IN ANTIPLAGUE WORK [1]

Rat Poisons Used by the National Antiplague Services of Ecuador, Peru, Chile, and the Argentine Republic

By J. D. Long, *Medical Director, United States Public Health Service, Traveling Representative, Pan American Sanitary Bureau*

In 1929, when the intensification of the antiplague measures began in Guayaquil, Ecuador, it was decided that the prime requisite to be considered in the use of rat poison was that the poison should be slow in its action. This allows the animals to leave the houses in which the poison has been eaten and die outside or in their hiding places, taking their fleas with them, thus avoiding the production of human cases, so far as might be possible, by preventing the release of large numbers of presumably infected fleas within the houses or other inhabited premises within easy reach of the inhabitants.

With this end in view, commercial arsenic was chosen as the active ingredient of the poison. Commercial arsenic, 99 percent pure, in very fine powder and of a pure white color, which facilitates its mixing with other materials, such as corn meal, wheat flour, and barley flour, can be purchased at a very reasonable price when bought in large quantities.

Rats that have been poisoned with arsenic usually die from 24 to 72 hours after ingesting the poison. The majority die within 24 hours. Owing to the fact that rats are cannibals in their instincts and readily kill and eat each other, as soon as a rat feels sick he hides himself in as inaccessible place as he can find. Experience has shown that the place usually selected not only serves to conceal the sick rat from other rats, but is as well removed from contact with human

[1] See editorial note at end of article.

beings as the immediate local conditions will permit. He evidently seeks complete concealment and freedom from annoyances.

The experience of the last 6 years has demonstrated that arsenic is probably the most satisfactory of the various poisons, as it is cheap and is always well taken by the rats, if care is used to make the poison vehicle as attractive as possible. Experiences with other types of poisons have demonstrated them to be too rapid in their action, too expensive to use on a wholesale scale, lacking in keeping qualities, or are not well and consistently taken by the rats.[1]

The formulas of the poisons used are as follows:

1. *Poison packets.*—

	Percent
Coarsely ground corn meal	35
The cheapest grade of wheat flour to be had	35
Grated cheese, ground dried fish, dried blood, finely ground dried meat, either beef or pork, or finely ground peanuts	15
Commercial arsenic	15

The ingredients are mixed in a large trough with a shovel until uniformly distributed and are then put up in small torpedo-shaped paper packets, each of which holds one teaspoonful of the poison mixture.

In the antiplague work done in Guayaquil in 1929–30, the first poisoning was done with barium carbonate mixed and put up as described; but as the barium was expensive, arsenic was substituted for it in the succeeding poisonings. Plague, both human and rodent, disappeared after seven successive poisoning operations in the city.

In 1935, the first rat poisoning in the city was done with the poison packets, and the rat indices were reduced from a maximum of 6.7 rats per 100 traps in daily service to 4.8—a reduction of 28.3 percent in 1 month. The second poisoning, a partial one only, was also done with the packets and reduced the rat indices to 4.1 per 100 traps—a total reduction in 2 months of 38.8 percent.

2. *Fish poison.*—In order to obtain more rapid results through varying the poison, it was decided to try a poison made from the meat of fresh fish mixed with arsenic. I had seen this poison used on a small scale in the ports of Rosario and Santa Fe, Argentine Republic, by Dr. Albornoz, of the Argentine National Department of Hygiene, where good results were obtained. The formula is as follows:

	Percent
Meat of fresh fish, any cheap variety, without bones	85
Commercial arsenic	15

The meat of the fish is passed through a meat grinder and finely ground. The arsenic is then mixed with it and the whole mass is thoroughly kneaded (rubber gloves being worn) until the mixture is complete and the arsenic is thoroughly distributed. If the fish is not too oily, the poison product will be a thick paste which may be

[1] See editorial at end of article.

spread on bread, pieces of banana leaf, pieces of paper, or on shavings, and then placed in or near rat holes or rat runs. If the fish is very oily, ground dried salted fish may be mixed with it to make a thick paste, or cheap barley flour or other flour may be used until the final mass is about the consistency of thin dough.

The fish poison is very attractive to rats; they eat it, in the first two or three poisonings, in great quantities. Later, it is, at times, desirable to vary the composition by adding fresh blood (obtained from the city slaughterhouse) that has been boiled down in a large vessel to the consistency of a thick jelly. The blood may be added in varying quantities, depending upon the resulting consistency.

3. *Fresh blood poison.*—

	Percent
Fresh blood obtained from the slaughterhouse and boiled down to a jellylike consistency	60
Barley flour or meal, wheat flour, finely ground corn meal, or ground salt fish, to give consistency	25
Commercial arsenic	15

This poison may also be spread on bread, banana leaf, paper or wood shavings, as described for the fish poison.

This poison is also very attractive to rats and makes a good variant for use after several poisonings with other types of poison.

For the first two poisonings of an infected city either one of the poisons described here may be used, and very good results will be obtained, provided that the poison has been generously used and has been carefully placed and well distributed. Subsequent poisonings should be done with some of the other poisons described, or with similar poisons, the main object being to have a variety of poisons, which are changed from time to time, so that the rats will not become accustomed to any one type of poison and refuse to eat it.

In the antiplague work in Peru over 350 tons of poison packets (over 100,000,000 poisoned baits) have been used since the work began in 1930. Plague has been reduced in about 90 percent of the cases and the number of infected foci has been reduced in about 95 percent. Fish poison is now used.

Since August 27, 1935, in Guayaquil, Ecuador, 17,691 pounds of poison packets have been used, and over 40,000 pounds of fish poison. Owing to the scarcity of fish at times, some fresh blood was mixed with the fish poison so as to make the amount of fish available go further. Poison made of fresh blood has been used principally in the towns of Duran and Daule, where it has given good results.

Taking into consideration the enormous amounts of poison used, surprisingly few accidents have occurred. The use of the poison packets has caused the death of chickens, some domestic animals, such as cats and dogs, and occasionally a burro, where the poison had been gathered up by the householder and thrown out where the burros

could have access to it. One child was poisoned. Using a piece of wire, this child fished the packets out of the holes and rat burrows and eat them, in spite of the fact that warning had been given that poisoning was to be done. Ten packets in all were eaten. The dead child's brother, who had accompanied him and had eaten six packets, did not die. The amount of arsenic in a single packet is just about sufficient to kill an animal the size and weight of a rat. It takes from four to six packets to kill a dog of medium size.

The poison made of fish and fresh blood that has been boiled down does not seem to be so attractive to animals as the poison packets. There has been no complaint of domestic animals being killed, and no accidents to human beings have occurred. The people generally prefer the poisons made of fish and fresh blood to the poison packets, as experience has shown them that there is less danger to animals, and they are not so fearful of the safety of their children.

Ratproofing has been used so far as possible, especially in the cities; but in the rural districts, where the large majority of the houses are built of adobe, bamboo, and mud wattle (or worse), ratproofing has been out of the question.

Data are not available as to the amounts of poison used in Chile and the Argentine, but the amounts are very large and the results have been good.

EDITORIAL NOTE.—The exclusive use of poison for the destruction of rats in the control of plague is a more or less temporary expedient unless continually repeated; as an urban antiplague measure, it presents a method of control which is quickly applicable and which should be used pending the realization of ratproofing and other antiplague measures of more permanent value. It is expedient to utilize repeated poisoning in impoverished communities where the more costly and permanent antiplague measures cannot be employed for economic reasons, and also in combating rural plague in sparsely settled regions or in maintaining rodent-free rural zones cirumscribing and localizing a focus of plague infection. Detailed descriptions of the preparation of poisoned baits for use in rat poisoning may be found in the Public Health Reports for September 12, 1930, pages 2166–2169, and Public Health Bulletin No. 213, pages 63–68.

DEATHS DURING WEEK ENDED APRIL 11, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr. 11, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,206	8,448
Deaths per 1,000 population, annual basis	12.9	11.8
Deaths under 1 year of age	586	580
Deaths under 1 year of age per 1,000 estimated live births	53	53
Deaths per 1,000 population, annual basis, first 15 weeks of year	13.7	12.7
Data from industrial insurance companies:		
Policies in force	68,350,305	67,734,319
Number of death claims	12,909	13,248
Death claims per 1,000 policies in force, annual rate	9.9	10.2
Death claims per 1,000 policies, first 15 weeks of year, annual rate	10.9	10.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Apr. 18, 1936, and Apr. 20, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 18, 1936, and Apr. 20, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr 18, 1936	Week ended Apr 20, 1935	Week ended Apr 18, 1936	Week ended Apr 20, 1935	Week ended Apr 18, 1936	Week ended Apr 20, 1935	Week ended Apr 18, 1936	Week ended Apr 20, 1935
New England States:								
Maine	2		13	8	117	109	0	0
New Hampshire			1		15	2	0	0
Vermont	3	2			593	46	0	0
Massachusetts	6	3			1,216	453	4	3
Rhode Island	1	2			78	343	1	1
Connecticut	2	2	6	6	104	1,065	0	1
Middle Atlantic States.								
New York	43	33	[1] 13	[1] 9	2,653	3,156	21	24
New Jersey	11	12	53	15	311	1,244	6	3
Pennsylvania	48	35			1,509	3,044	12	6
East North Central States.								
Ohio	21	49	173	19	360	1,549	52	11
Indiana	10	20	83	22	24	365	8	4
Illinois	35	29	54	46	31	3,197	19	23
Michigan	9	5	14	2	68	6,488	4	5
Wisconsin	1	1	71	6	94	1,555	2	1
West North Central States:								
Minnesota		6	1	3	520	615	2	1
Iowa	4	8	8	3	8	537	4	4
Missouri	25	44	532	103	19	776	6	8
North Dakota	8	5	7	13	2	31	0	0
South Dakota		6		1	15	68	1	0
Nebraska	6	5			93	365	0	0
Kansas	8		43	8	22	1,372	4	2
South Atlantic States.								
Delaware		1			6	13	0	0
Maryland [2]	2	5	12	7	255	49	22	6
District of Columbia	13	15	1	2	96	92	5	5
Virginia	30	11	334		104	735	8	7
West Virginia	8	17	124	37	99	317	14	1
North Carolina [3]	12	11	18	10	57	226	6	1
South Carolina	1	6	299	157	35	39	8	1
Georgia [4]	4	4	180				1	0
Florida	5	2	51	2	13	81	8	0
East South Central States:								
Kentucky	7	16	262	20	54	514	33	4
Tennessee	5	5	427	40	63	19	8	6
Alabama [4]	9	12	421	73	60	214	2	2
Mississippi [3]	2	1					2	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 18, 1936, and Apr. 20, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 18, 1936	Week ended Apr. 20, 1935	Week ended Apr. 18, 1936	Week ended Apr. 20, 1935	Week ended Apr. 18, 1936	Week ended Apr. 20, 1935	Week ended Apr. 18, 1936	Week ended Apr. 20, 1935
West South Central States:								
Arkansas	6	4	1,040	18	6	70	0	1
Louisiana	13	19	258	4	41	35	5	0
Oklahoma [3]	10	11	538	58	16	91	7	4
Texas [4]	34	36	592	301	418	185	7	6
Mountain States:								
Montana [3]	2	2	33	27	6	609	1	0
Idaho		1	7	3	19	4	2	0
Wyoming		2			7	120	0	0
Colorado	5	5			19	233	0	1
New Mexico	3	3	8	6	49	27	3	0
Arizona	6		119	9	144	23	0	2
Utah [3]		3			31	10	1	0
Pacific States:								
Washington		1	6		451	342	3	3
Oregon	1	7	106	33	305	205	2	1
California	24	30	564	62	2,692	1,413	6	4
Total	445	497	6,472	1,133	12,898	32,046	300	154
First 16 weeks of year	9,317	10,985	122,290	96,179	141,594	420,741	3,809	2,138

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr 18, 1936	Week ended Apr 20, 1935	Week ended Apr 18, 1936	Week ended Apr 20, 1935	Week ended Apr 18, 1936	Week ended Apr. 20, 1935	Week ended Apr. 18, 1936	Week ended Apr. 20, 1935
New England States:								
Maine	0	0	22	6	0	0	0	1
New Hampshire	0	0	4	9	0	0	0	0
Vermont	0	0	11	7	0	0	0	0
Massachusetts	0	0	253	237	0	0	0	5
Rhode Island	0	0	24	7	0	0	0	0
Connecticut	0	0	63	110	0	0	2	0
Middle Atlantic States:								
New York	1	0	965	1,241	0	0	7	10
New Jersey	0	2	427	173	0	0	0	0
Pennsylvania	1	0	746	548	0	0	2	3
East North Central States:								
Ohio	1	1	473	773	2	3	22	5
Indiana	0	0	294	168	7	0	1	2
Illinois	0	0	705	1,251	4	0	4	18
Michigan	2	0	320	352	1	0	1	2
Wisconsin	0	0	490	410	9	14	3	2
West North Central States:								
Minnesota	0	0	377	339	10	0	1	0
Iowa	0	0	220	81	26	18	1	0
Missouri	0	0	231	69	9	2	1	4
North Dakota	0	0	41	66	15	0	0	0
South Dakota	0	0	62	8	22	5	0	0
Nebraska	0	0	137	57	11	33	0	1
Kansas	0	2	386	70	24	17	0	2
South Atlantic States:								
Delaware	0	0	5	7	0	0	0	0
Maryland [3]	0	0	71	108	0	0	0	7
District of Columbia	0	0	16	90	0	0	0	0
Virginia	0	0	42	26	2	0	3	11
West Virginia	0	0	47	57	0	0	6	3
North Carolina [3]	1	0	10	14	0	2	1	7
South Carolina	0	0	3	6	1	0	3	1
Georgia [4]	1	0	24	5	0	1	6	11
Florida	0	0	8	3	0	0	6	8
East South Central States:								
Kentucky	0	0	79	28	1	0	6	8
Tennessee	0	0	24	25	0	0	1	5
Alabama [4]	0	0	7	8	0	0	1	1
Mississippi [3]	0	0	3	5	1	0	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 18, 1936, and Apr. 20, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr 18, 1936	Week ended Apr 20, 1935	Week ended Apr 18, 1936	Week ended Apr 20, 1935	Week ended Apr 18, 1936	Week ended Apr 20, 1935	Week ended Apr 18, 1936	Week ended Apr. 20, 1935
West South Central States:								
Arkansas	0	0	12	4	0	1	1	1
Louisiana	0	0	8	4	0	0	2	18
Oklahoma [5]	0	0	53	11	0	1	2	6
Texas [4]	0	0	59	50	0	11	6	6
Mountain States:								
Montana [3]	0	0	76	5	15	5	1	0
Idaho	0	0	33	4	1	1	0	0
Wyoming	0	0	54	21	8	15	0	0
Colorado	0	0	94	215	2	0	0	0
New Mexico	0	1	88	14	0	1	0	5
Arizona	0	0	16	55	0	0	1	1
Utah [2]	0	0	64	135	2	0	1	0
Pacific States:								
Washington	0	0	80	48	3	15	1	1
Oregon	0	0	56	58	22	2	1	1
California	4	2	263	205	6	3	12	6
Total	11	8	7,546	7,193	204	150	106	163
First 16 weeks of year	295	386	124,257	115,048	3,663	3,068	1,767	2,103

[1] New York City only
[2] Week ended earlier than Saturday
[3] Rocky Mountain spotted fever, week ended Apr 18, 1936, 2 cases, as follows North Carolina, 1; Montana, 1
[4] Typhus fever, week ended Apr 18, 1936, 4 cases, as follows Georgia, 1, Alabama, 1, Texas, 2
[5] Exclusive of Oklahoma City and Tulsa

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week,

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January 1936										
Puerto Rico	--- ---	80	20	1,478	15	1	0	--------	0	36
March 1936										
Florida	18	27	220	16	38	-------	1	35	0	8
Maryland	68	21	220	1	872	1	1	379	0	11
Michigan	16	37	52	3	369	1	8	1,653	6	11
Minnesota	13	19	2	- --	1,538	- -----	1	1,924	24	3
New Jersey	26	63	160	2	1,064	-----	-----	2,707	0	8
Ohio	57	120	461	1	1,440	----	1	1,867	1	148
Pennsylvania	58	167		1	4,428	1	4	2,443	0	87
South Carolina	----	116	3,096	235	112	49	2	12	6	2
Tennessee	77	53	2,011	46	396	12	1	183	8	8
West Virginia	31	45	778	------	117	-------	0	226	0	14

January 1936

Puerto Rico	Cases
Chicken pox	18
Dysentery	18
Filariasis	1
Leprosy	1
Mumps	76
Ophthalmia neonatorum	5
Puerperal septicemia	4
Tetanus	17
Tetanus, infantile	3
Whooping cough	3

March 1936

	Cases
Anthrax	
New Jersey	1
Pennsylvania	2
West Virginia	1
Chicken pox	
Florida	228
Maryland	843
Michigan	2,167
Minnesota	399
New Jersey	1,698
Ohio	1,968
Pennsylvania	3,935
South Carolina	96

March 1936—Continued

	Cases
Chicken pox—Contd.	
Tennessee	183
West Virginia	158
Diarrhea	
Maryland	7
Ohio (under 2 years)	10
South Carolina	119
Dysentery:	
Florida	1
Maryland (bacillary)	2
Michigan (amoebic)	2
Minnesota (amoebic)	4

March 1936—Continued

Dysentery—Contd.	Cases
New Jersey	1
Ohio (amoebic)	1
Pennsylvania (bacillary)	1
South Carolina	1
Tennessee (amoebic)	2
Tennessee (unspecified)	2
Epidemic encephalitis:	
Minnesota	1
New Jersey	4
Pennsylvania	2
South Carolina	4
Tennessee	3
German measles:	
Maryland	233
Michigan	715
New Jersey	769
Ohio	188
Pennsylvania	2,406
South Carolina	44
Tennessee	13
Hookworm disease:	
South Carolina	32
Impetigo contagiosa:	
Maryland	11
Michigan	5
Tennessee	3
Lead poisoning:	
Michigan	4
Ohio	4
Mumps:	
Florida	293
Maryland	592
Michigan	1,805
New Jersey	1,591
Ohio	1,758
Pennsylvania	3,931
South Carolina	201
Tennessee	470
West Virginia	351

March 1936—Continued

Ophthalmia neonatorum:	Cases
Maryland	1
New Jersey	8
Ohio	77
Pennsylvania	6
South Carolina	9
Tennessee	1
Paratyphoid fever:	
New Jersey	2
Ohio	2
South Carolina	1
Puerperal septicemia:	
Ohio	1
Tennessee	2
Rabies in animals:	
Maryland	4
Michigan	1
New Jersey	49
South Carolina	51
West Virginia	1
Rabies in man:	
Pennsylvania	1
Rocky Mountain spotted fever:	
Ohio	1
Scabies:	
Maryland	2
Michigan	4
Tennessee	8
Septic sore throat:	
Maryland	21
Michigan	88
Minnesota	4
Ohio	188
Tennessee	3
Tetanus:	
Maryland	2
Ohio	3
Tennessee	2
Trachoma:	
Michigan	1
Minnesota	1

March 1936—Continued

Trachoma—Contd.	Cases
New Jersey	1
Ohio	2
Pennsylvania	1
Trichinosis:	
Michigan	32
Pennsylvania	1
Tennessee	1
Tularaemia:	
Maryland	1
Michigan	1
South Carolina	3
Tennessee	1
Typhus fever.	
Florida	2
Pennsylvania	1
South Carolina	3
Undulant fever:	
Florida	2
Maryland	2
Michigan	11
Minnesota	2
New Jersey	8
Ohio	6
Pennsylvania	4
Tennessee	1
Vincent's infection:	
Maryland	9
Michigan	31
South Carolina	3
Tennessee	42
Whooping cough:	
Florida	46
Maryland	188
Michigan	1,556
Minnesota	108
New Jersey	577
Ohio	857
Pennsylvania	1,218
South Carolina	68
Tennessee	31
West Virginia	60

CASES OF VENEREAL DISEASES REPORTED FOR FEBRUARY 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama [1]				
Arizona	27	.59	113	2.47
Arkansas	200	1.07	121	.64
California	1,243	2.02	1,032	1.68
Colorado [2]				
Connecticut	204	1.23	114	.69
Delaware	86	3.55	33	1.36
District of Columbia	116	2.33	121	2.43
Florida	235	1.49	73	.46
Georgia	1,146	3.94	542	1.86
Idaho	0	0	0	0
Illinois	1,382	1.75	1,008	1.28
Indiana	171	.52	120	.36
Iowa [3]	128	.52	99	.40
Kansas	75	.39	56	.29
Kentucky	195	.73	202	.76
Louisiana	511	2.36	97	.45
Maine	23	.29	53	.66
Maryland	669	4.00	190	1.14
Massachusetts	426	.98	396	.91
Michigan	520	1.02	480	.94
Minnesota	247	.95	203	.78
Mississippi	1,144	5.56	1,660	8.07
Missouri	376	1.02	240	.65
Montana [3]	20	.37	16	.30

See footnotes at end of table.

Reports from States—Continued

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Nebraska	25	.18	53	.38
Nevada [2]				
New Hampshire	12	.26	13	.28
New Jersey [1]				
New Mexico	52	1.19	49	1.12
New York	6,520	4.99	1,122	.86
North Carolina	1,159	3.51	421	1.28
North Dakota	18	.26	29	.42
Ohio	537	.79	259	.38
Oklahoma [3]	191	.77	123	.50
Oregon	68	.69	125	1.26
Pennsylvania	208	.21	131	.13
Rhode Island	158	2.24	59	.84
South Carolina [3]	280	1.60	329	1.88
South Dakota	3	.04	19	.27
Tennessee	1,030	3.85	505	1.89
Texas	164	.27	99	.16
Utah [2]				
Vermont	12	.33	11	.30
Virginia	564	2.31	382	1.56
Washington	133	.83	147	.91
West Virginia	157	.88	85	.48
Wisconsin [4]	27	.09	133	.44
Wyoming [2]				
Total	20,462	1.74	11,063	.94

Reports from cities of 200,000 population or over

	Syphilis cases	Syphilis rate	Gonorrhea cases	Gonorrhea rate
Akron, Ohio	29	1.07	2	0.07
Atlanta, Ga	142	4.95	122	4.25
Baltimore, Md	422	5.11	114	1.38
Birmingham, Ala	121	4.29	59	2.09
Boston, Mass	184	2.33	170	2.15
Buffalo, N. Y	177	2.99	44	.74
Chicago, Ill	723	2.03	640	1.79
Cincinnati, Ohio	47	1.01	36	.77
Cleveland, Ohio	152	1.63	55	.59
Columbus, Ohio	3	.10	9	.29
Dallas, Tex	84	2.90	16	.55
Dayton, Ohio	64	3.04	58	2.76
Denver, Colo	23	.78	11	.37
Detroit, Mich	185	1.07	266	1.54
Houston, Tex. [5]	201	6.00	56	1.67
Indianapolis, Ind	18	.48	38	1.01
Jersey City, N. J	1	.03	1	.03
Kansas City, Mo	58	1.38	4	.09
Los Angeles, Calif	420	2.98	328	2.29
Louisville, Ky	287	8.86	122	3.77
Memphis, Tenn	222	8.31	62	2.32
Milwaukee, Wis	5	.08	13	.21
Minneapolis, Minn	53	1.09	65	1.34
Newark, N. J	149	3.28	96	2.07
New Orleans, La. [1]				
New York, N. Y	4,978	6.82	677	.93
Oakland, Calif	25	.82	14	.46
Omaha, Nebr	8	.36	10	.45
Philadelphia, Pa	214	1.08	78	.39
Pittsburgh, Pa	49	.72	20	.29
Portland, Oreg	53	1.69	79	2.52
Providence, R. I	95	3.67	32	1.24
Rochester, N. Y	56	1.66	58	1.72
St. Louis, Mo	267	3.19	208	2.49
St. Paul, Minn	25	.89	39	1.38
San Antonio, Tex. [2]				
San Francisco, Calif	96	1.43	123	1.83
Seattle, Wash	101	2.66	97	2.55
Syracuse, N. Y	121	5.55	56	2.57
Toledo, Ohio	38	1.25	20	.66
Washington, D. C. [6]	116	2.33	121	2.43

[1] No report for current month.
[2] Not reporting.
[3] Incomplete.
[4] Only cases of syphilis in the infectious stage are reported.
[5] Reported by the Jefferson Davis Hospital; physicians are not required to report venereal disease.
[6] Reported by the Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Apr. 11, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross-section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	6	2	0	0	0	0	34
New Hampshire:											
Concord	0	------	0	0	0	1	0	0	0	0	10
Manchester	0	------	1	0	2	0	0	0	0	0	24
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	36	0	0	0	0	0	2	7
Rutland	0	------	0	144	0	1	0	0	0	0	4
Massachusetts:											
Boston	2	------	0	439	4	80	0	7	0	18	207
Fall River	1	------	0	2	2	16	0	1	0	0	31
Springfield	0	------	0	1	2	2	0	1	0	5	42
Worcester	0	------	0	4	11	15	0	2	0	9	55
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	25
Providence	1	------	0	13	3	17	0	2	0	8	58
Connecticut:											
Bridgeport	2	------	0	5	5	3	0	0	0	0	40
Hartford	0	------	0	0	8	1	0	0	0	1	43
New Haven	0	1	3	0	2	0	0	2	0	63	54
New York:											
Buffalo	0	------	0	41	8	70	0	13	0	11	164
New York	40	14	4	1,893	148	464	0	98	2	85	1,559
Rochester	0	------	0	3	8	10	0	2	0	0	[illegible]
Syracuse	0	------	0	54	5	12	0	0	0	10	54
New Jersey:											
Camden	1	------	2	3	3	8	0	1	0	2	25
Newark	0	4	0	5	4	169	0	4	0	14	78
Trenton	0	------	0	0	3	4	0	2	0	3	38
Pennsylvania:											
Philadelphia	4	14	15	440	50	86	0	20	2	56	486
Pittsburgh	6	2	1	15	29	96	0	3	0	25	164
Reading	0	------	0	3	5	1	0	1	0	1	28
Scranton	0	------	------	0	------	4	0	------	0	0	------
Ohio:											
Cincinnati	3	------	1	17	15	15	0	10	0	3	133
Cleveland	4	62	6	54	22	78	0	8	0	71	221
Columbus	0	5	5	2	10	11	0	7	0	10	104
Toledo	0	1	1	61	6	7	0	4	0	18	60
Indiana:											
Anderson	0	------	0	1	3	6	0	0	0	2	11
Fort Wayne	0	------	1	0	7	6	0	0	0	0	42
Indianapolis	0	------	0	2	18	47	0	3	0	8	107
Muncie	0	------	0	0	3	6	0	0	0	0	12
South Bend	0	------	0	0	2	5	0	0	0	1	17
Terre Haute	0	------	0	0	2	6	0	1	0	0	23
Illinois:											
Alton	0	------	0	1	0	0	0	0	0	0	8
Chicago	14	14	13	14	88	231	0	50	1	172	847
Elgin	0	------	0	0	1	1	0	0	0	2	10
Moline	0	2	0	0	1	6	0	0	0	0	16
Springfield	0	------	0	0	4	14	0	0	0	0	21
Michigan:											
Detroit	5	14	7	29	40	125	0	20	0	142	314
Flint	1	------	0	2	11	16	0	1	0	17	36
Grand Rapids	0	------	0	3	2	9	0	2	0	2	34
Wisconsin:											
Kenosha	0	------	0	2	0	12	0	3	0	1	12
Madison	0	------	0	1	2	9	0	0	0	10	31
Milwaukee	0	2	2	2	3	82	0	1	0	68	92
Racine	0	------	0	2	3	18	0	0	0	0	13
Superior	0	------	0	0	2	14	0	0	0	0	11
Minnesota:											
Duluth	0	------	0	1	2	2	0	1	0	13	18
Minneapolis	0	------	2	102	4	123	0	3	0	6	95
St. Paul	1	------	0	83	7	42	0	2	0	4	68

City reports for week ended Apr. 11, 1936

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa:											
Cedar Rapids	0	------	------	0	------	3	0	------	0	4	------
Davenport	0	------	------	0	------	19	0	------	0	0	------
Des Moines	0	------	------	1	------	12	2	------	0	0	34
Sioux City	0	------	------	1	------	15	14	------	0	0	------
Waterloo	1	------	------	0	------	3	0	------	0	0	------
Missouri:											
Kansas City	4	------	3	1	16	79	0	11	0	4	137
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	4	------	9	2	32	56	1	21	0	7	297
North Dakota:											
Fargo	0	------	0	0	1	0	1	0	0	4	6
Grand Forks	1	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	3	0	0	1	0	6
South Dakota:											
Aberdeen	0	------	------	0	------	1	0	------	0	0	------
Sioux Falls	0	------	0	0	0	11	11	0	0	0	6
Nebraska:											
Omaha	1	------	1	10	12	85	3	1	0	0	68
Kansas:											
Lawrence	0	6	0	1	1	1	0	0	0	0	5
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	------	0	1	10	28	0	1	0	3	38
Delaware:											
Wilmington	0	------	0	1	4	2	0	1	0	4	29
Maryland:											
Baltimore	1	3	1	125	31	35	0	13	0	55	220
Cumberland	0	------	0	0	4	1	0	2	1	0	19
Frederick	1	------	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	0	1	1	68	26	18	0	7	1	20	197
Virginia:											
Lynchburg	0	------	0	1	0	1	0	1	0	12	18
Norfolk	1	1	0	0	6	0	0	1	0	0	24
Richmond	1	------	1	0	5	20	0	4	0	0	65
Roanoke	0	------	0	0	3	1	0	0	0	0	22
West Virginia:											
Charleston	1	4	1	0	18	1	0	1	0	0	48
Huntington	1	0	------	0	------	1	0	------	0	0	------
Wheeling	0	------	2	11	2	1	0	1	2	3	16
North Carolina:											
Gastonia	0	------	0	0	0	0	0	0	0	0	6
Raleigh	0	------	0	2	2	0	0	3	0	0	12
Wilmington	0	------	0	0	3	0	0	0	0	0	11
Winston-Salem	0	------	0	49	4	0	0	0	0	0	14
South Carolina:											
Charleston	1	8	1	0	2	0	0	2	0	8	18
Columbia	0	------	0	0	3	0	0	0	0	0	13
Florence	0	------	0	0	1	0	0	0	0	1	5
Greenville	1	------	0	6	2	0	0	0	0	0	8
Georgia:											
Atlanta	3	7	1	1	11	15	0	11	0	2	96
Brunswick	0	------	0	0	1	0	0	0	0	0	3
Savannah	0	5	2	1	3	0	0	1	1	0	37
Florida:											
Miami	1	6	2	4	2	1	0	2	1	15	39
Tampa	0	3	3	8	2	2	0	1	1	0	18
Kentucky:											
Ashland	0	------	------	0	------	0	0	------	0	3	------
Covington	2	------	0	1	1	0	0	1	0	0	18
Lexington	0	------	0	5	3	0	0	1	0	2	24
Tennessee:											
Knoxville	0	------	4	26	2	0	0	2	0	0	33
Memphis	1	------	7	2	13	4	0	2	0	14	103
Nashville	1	------	0	1	10	5	0	0	0	0	------
Alabama:											
Birmingham	1	21	3	0	10	1	0	1	0	2	68
Mobile	0	5	1	0	4	1	0	1	0	0	29
Montgomery	0	11	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	1	------	------	0	------	2	0	------	0	0	------
Little Rock	0	131	0	0	8	3	0	4	0	0	13

City reports for week ended Apr. 11, 1936

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	0	------	0	1	1	0	0	0	0	0	5
New Orleans	1	46	18	8	29	9	0	10	2	26	181
Shreveport	1	------	0	25	9	3	0	1	0	0	37
Oklahoma.											
Oklahoma City	1	30	5	0	15	4	0	0	0	0	48
Tulsa	0	------	------	0	------	5	0	------	0	0	------
Texas:											
Dallas	4	4	3	19	10	6	0	0	0	6	83
Fort Worth	0	------	1	0	8	4	0	2	1	0	44
Galveston	2	------	0	0	8	0	0	1	0	0	16
Houston	5	------	3	1	13	7	0	4	1	0	75
San Antonio	3	------	5	5	10	1	0	7	0	0	71
Montana:											
Billings	0	------	0	0	1	6	0	0	0	1	8
Great Falls	0	------	0	0	3	3	0	0	0	2	16
Helena	0	------	0	0	1	1	0	0	0	0	6
Missoula	0	------	0	0	0	4	0	0	0	0	2
Idaho:											
Boise	0	------	0	10	1	2	0	0	0	0	5
Colorado:											
Colorado Springs	1	------	0	1	3	3	0	0	0	4	11
Denver	2	------	1	7	8	15	1	2	0	24	81
Pueblo	0	------	0	0	1	17	0	0	0	4	7
New Mexico:											
Albuquerque	0	------	0	0	1	10	0	2	0	0	11
Utah:											
Salt Lake City	0	------	3	7	6	41	0	0	0	2	44
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	[illegible]
Washington:											
Seattle	------	------	------	------	------	------	------	------	------	------	------
Spokane	0	------	0	3	5	26	0	0	0	4	28
Tacoma	------	------	------	------	------	------	------	------	------	------	------
Oregon:											
Portland	0	4	1	61	10	14	0	2	2	5	91
Salem	0	6	------	9	------	1	0	------	0	1	------
California:											
Los Angeles	5	19	2	538	20	52	0	24	0	21	335
Sacramento	4	------	0	4	1	8	0	1	1	7	19
San Francisco	0	0	3	357	9	85	0	14	0	27	197

City reports for week ended Apr. 11, 1936—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	5	4	0
Springfield	0	1	0
Rhode Island			
Providence	2	0	0
New York.			
New York	15	4	0
New Jersey			
Newark	2	3	0
Pennsylvania:			
Philadelphia	3	0	1
Ohio			
Cincinnati	11	5	0
Columbus	1	1	0
Indiana			
Indianapolis	0	1	0
Illinois			
Chicago	8	1	0
Springfield	1	1	0
Michigan			
Detroit	4	0	1
Minnesota.			
Minneapolis	0	1	0
Missouri:			
Kansas City	1	0	0
Nebraska.			
Omaha	1	1	0
Maryland			
Baltimore	18	5	0
District of Columbia.			
Washington	3	2	0
Virginia			
Lynchburg	0	1	0
Norfolk	2	1	0
Richmond	1	1	0
West Virginia			
Huntington	2	0	0
North Carolina			
Wilmington	0	1	0
South Carolina			
Charleston	1	0	0
Georgia			
Atlanta	2	1	0
Florida			
Tampa	2	0	0
Kentucky			
Lexington	1	0	0
Tennessee			
Knoxville	1	0	0
Alabama			
Birmingham	0	1	0
Louisiana			
New Orleans	2	0	0
Shreveport	0	1	0
Oklahoma			
Oklahoma City	2	0	0
Texas			
Dallas	1	1	0
Galveston	0	1	0
Houston	3	3	0
New Mexico			
Albuquerque	1	0	0
California			
Los Angeles	3	0	0
San Francisco	0	1	0

Pellagra.—Cases: Charleston, S. C., 1; Savannah, 1; Miami, 1; Dallas, 3.
Rabies in man.—Deaths: Memphis, 1.
Typhus fever.—Deaths: New York, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended April 4, 1936.—During the 2 weeks ended April 4, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	3					4
Chicken pox		27	2	147	408	32	37	19	79	751
Diphtheria		9	8	26	10	4	10	5		72
Dysentery				2						2
Erysipelas				13	7	9	6	1	8	44
Influenza		29			106	2	18		207	362
Measles		53	12	2,916	6,571	944	1,415	157	2,003	14,071
Mumps		13			1,019	75	152	38	367	1,664
Pneumonia		21			37		12		20	90
Poliomyelitis								1		1
Scarlet fever		25	4	184	521	85	64	85	44	1,012
Smallpox					1			6		7
Trachoma							4		3	7
Tuberculosis	3	8	13	145	79	14	7	2	47	318
Typhoid fever	2	2	1	51	6	7	2	12	2	85
Undulant fever					4					4
Whooping cough		47	23	188	341	6	16	10	40	671

CUBA

Habana—Communicable diseases—4 weeks ended April 11, 1936.—During the 4 weeks ended April 11, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1		Poliomyelitis	[1] 6	
Diphtheria	20		Tuberculosis	29	
Leprosy	1	1	Typhoid fever	[1] 32	
Malaria	[1] 20				

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended April 4, 1936.—During the 4 weeks ended April 4, 1936, cases of certain notifiable diseases were reported in the provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		1		2	2		5
Chicken pox		49	3	6		32	90
Diphtheria		1		3		1	5
Leprosy		1			1		2
Malaria	67	19	14	79	179	974	1,332
Measles		1	1	15	5	10	32
Poliomyelitis		1		2		2	5
Tuberculosis	12	13	12	32	16	45	130
Typhoid fever	11	48	9	10	2	25	105

CZECHOSLOVAKIA

Communicable diseases—January 1936.—During the month of January 1936 certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	5		Paratyphoid fever	3	1
Cerebrospinal meningitis	6	4	Poliomyelitis	17	2
Chicken pox	379		Puerperal fever	35	16
Diphtheria	2,767	167	Scarlet fever	2,872	54
Dysentery	7	2	Trachoma	89	
Influenza	206	22	Typhoid fever	433	32
Lethargic encephalitis	3	3	Typhus fever	14	
Malaria	3				

IRISH FREE STATE

Vital statistics—Fourth quarter, ended December 31, 1935.—The following statistics for the Irish Free State for the quarter ended December 31, 1935, are taken from the Quarterly Return of Marriages, Births, and Deaths, issued by the Registrar General, and are provisional:

	Number	Rates per 1,000 population
Population	3,033,000	
Marriages	3,245	4.3
Births	13,948	18.4
Total deaths	10,384	13.7
Deaths under 1 year of age	873	(1)
Deaths from:		
Cancer	864	1.14
Diarrhea and enteritis (under 2 years)	155	
Diphtheria	97	
Dysentery	1	
Influenza	142	.20
Measles	37	
Puerperal sepsis	23	[2] 1.65
Scarlet fever	40	
Tuberculosis (all forms)	814	1.07
Typhoid fever	18	
Typhus fever	1	
Whooping cough	17	

[1] Deaths under 1 year per 1,000 births, 63.
[2] Per 1,000 births.

VIRGIN ISLANDS

Notifiable diseases—January–March 1936.—During the months of January, February, and March 1936 cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	January	February	March	Disease	January	February	March
Chicken pox			3	Pellagra	3	1	2
Dengue		8	3	Syphilis	8	8	7
Filariasis		4	5	Tetanus			1
Gonorrhea	10	5	4	Tuberculosis	1	2	1
Hookworm disease	4		7	Typhoid fever			1
Malaria			1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for April 24, 1936, pages 522–534. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued May 29, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India.—During the week ended April 11, 1936, cholera was reported in India as follows: Cholera was present in Punjab and 4 cases of cholera were reported in Rangoon.

Plague

Hawaii Territory—Hawaii Island—Hamakua District—Pohakea sector.—A rat found April 10, 1936, in Pohakea sector, Hamakua District, Hawaii Island, Hawaii Territory, has been proved plague infected.

Peru—Callao.—During the month of March 1936, 4 cases of plague with 1 death were reported at Callao, Peru. Plague rats were confirmed for Callao on March 10, 18, 19, 21, 22, and 23, 1936.

Smallpox

India—Sind State.—During the week ended April 11, 1936, 21 cases of smallpox were reported in Sind State, India.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Matto Grosso State, Aquidahuana, 1 case, 1 death, March 1, 1936; Minas Geraes State, Passos, 1 case, 1 death, March 3, 1936; Santa Cruz Areias, 1 case, 1 death, February 27, 1936; Uberaba, 3 cases, 3 deaths, March 11–18, 1936; Parana State, Jaguariahyva, 2 cases, 2 deaths, March 17–19, 1936; Sao Paulo State, Aracatuba, 1 case, 1 death, March 9, 1936; Araraquara, 2 cases, 2 deaths, March 15–16, 1936.

Gold Coast—Koforidua.—On April 15, 1936, 1 case of yellow fever was reported at Koforidua, Gold Coast.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES
PUBLIC HEALTH SERVICE

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen R C WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

VOL. 51 MAY 8, 1936 NO. 19

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

March 22–April 18, 1936

Influenza.—The death rate from all causes for the week ending January 11, 1936, in a group of 86 large cities[2] was 14.2 per 1,000 (annual basis), which was slightly above the rate of 14.0 for the corresponding week of 1935. In this week of 1935, there were more than 10,000 reported cases of influenza, but in the 1936 week there were 2,561 cases, which may be compared with 2,804 for the corresponding week of 1934—a year that was exceptionally free from influenza. After the small peak of January 11, 1936, the death rate in this group of cities dropped to 12.5 and 13.2 for the weeks ended January 25 and February 1, respectively. Following these weeks there was a steady rise to a peak of 14.8 for the week ended February 29, as compared with an average level of approximately 12.7 for the corresponding seasons of 1935 and 1934, with 1933 rates at a still lower level. During the 4 weeks of March 1936, following the 14.8 peak rate, there was only 1 week with a rate below 14.0, which may be compared with an average level of about 12.4 for the corresponding weeks of 1935 and 1934. The first week of April showed considerable decline; but the rate (13.0) was still above the 1935 and 1934 levels, and it remained so until April 25, the last week with available data (see table 1).

It is seen that the January peak of 1936 was not accompanied by an excessive number of reported influenza cases. However, the reported number of cases rose from 3,025 for the week ended February 1 to a peak of 11,870 cases for the week ended February 22, which was 1 week earlier than the death peak. This rise in 1936 may be compared with a rise from 2,714 to only 3,683 cases in the corresponding weeks of 1934. In each of the 5 weeks following the peak of February 22, 1936, more than 10,000 cases were reported, but by April 25, the last week with available data, the weekly number of cases had dropped to approximately 4,100.

[1] From the Office of Statistical Investigations, U. S. Public Health Service. These summaries include only the 8 important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers. The numbers of States included for the various diseases are as follows: Typhoid fever, 48; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 47; diphtheria, 48; scarlet fever, 48, influenza, 44 States and New York City. The District of Columbia is counted as a State in these reports.

[2] Data from the Weekly Health Index of the U. S. Bureau of the Census.

If the death rates be expressed in terms per 100,000 population and the years 1935 and 1934 be used as approximate norms, it is found that, for the peak week ended February 29, the excess rate was about 210 per 100,000 (annual basis), and that for a period of 6 or 7 weeks the excess rate was approximately 150 to 200 per 100,000. While these excess rates refer to all causes of death, it has been shown [3] that such excess rates serve to delimit and measure the extent of an influenza epidemic about as well as excess rates from influenza and pneumonia.

Weekly death rates from all causes in 86 large cities and weekly number of reported cases of influenza in 44 States and New York City

DEATH RATES [1] FROM ALL CAUSES PER 1,000 POPULATION (ANNUAL BASIS) IN 86 LARGE CITIES

	Week ended—												
	Feb 1	Feb 8	Feb 15	Feb 22	Feb 29	Mar 7	Mar 14	Mar. 21	Mar 28	Apr 4	Apr 11	Apr 18	Apr. 25
YEAR													
1936	13 2	13 4	13 9	14 0	14 8	14 2	14 1	13 8	14 2	13.0	12 9	13.2	13.0
1935	12 7	13 1	12 6	12 1	13 2	12 8	12 2	12.6	12 0	12 0	11 8	12 3	12.6
1934	12.3	12.2	13 6	12 8	12.8	13 2	12.6	12 5	12 3	12 6	12 4	12.2	12.0
1933	12 1	11 8	12 4	12 3	11 5	11 9	12 1	11.7	11 3	11 6	11 1	11 0	11.3

INFLUENZA CASES REPORTED IN 44 STATES AND NEW YORK CITY

REGION AND YEAR	Feb 1	Feb 8	Feb 15	Feb 22	Feb 29	Mar 7	Mar 14	Mar. 21	Mar 28	Apr 4	Apr 11	Apr 18	Apr. 25
All States [2]													
1936	3,025	4,577	9,077	11,870	11,515	11,746	10,163	10,118	10,262	8,263	7,128	6,138	4,163
1935	10,252	9,530	8,591	7,018	5,727	7,030	3,744	2,955	2,054	2,073	1,662	1,133	950
1934	2,714	2,819	3,825	3,683	3,341	2,971	2,754	2,193	2,090	2,176	1,712	1,161	1,292
1933	10,880	7,304	5,731	4,637	3,643	3,163	2,336	2,190	1,861	1,435	1,317	1,002	1,127
New England and Middle Atlantic													
1936	31	78	118	108	163	229	200	168	86	80	48	86	107
1935	144	83	73	63	95	250	61	36	104	48	22	38	31
1934	62	71	53	48	90	50	58	45	34	42	33	30	33
1933	1,609	505	257	233	192	91	68	73	80	170	47	40	32
East North Central													
1936	226	174	231	230	291	279	269	191	424	278	189	395	224
1935	1,195	416	586	335	573	280	321	146	252	127	250	95	219
1934	301	236	329	346	284	193	298	168	248	146	154	74	151
1933	1,018	665	568	685	345	512	481	208	379	144	263	144	268
West North Central													
1936	217	266	362	440	704	697	1,032	1,178	1,530	1,069	835	591	526
1935	626	765	898	531	533	296	235	155	173	70	181	131	88
1934	73	97	336	261	226	230	207	276	99	109	114	67	121
1933	1 045	114	269	74	85	54	36	30	11	50	22	7	28
South Atlantic													
1936	1,197	1,729	2,551	2,860	4,135	3,162	2,592	2,081	1,615	1,339	794	685	596
1935	2,783	2,393	2,096	1,489	1,353	1,229	933	487	524	384	366	215	206
1934	1,211	943	1,232	1,271	1,016	1,027	905	714	873	620	489	465	464
1933	4,042	3,586	3,104	2,522	1,821	1,597	1,044	1,181	617	510	503	319	304
East and West South Central.													
1936	1,036	1,584	1,675	2,774	3,930	4,754	4,450	4,830	4,335	4,775	4,238	3,538	2,428
1935	3,150	4,400	3,998	3,707	2,472	4,331	1,071	1,898	818	1,031	660	514	298
1934	935	1,317	1,711	1,567	1,531	1,316	1,118	842	718	742	565	819	381
1933	1,954	1 706	1,122	768	907	656	560	563	635	428	333	398	466
Mountain and Pacific													
1936	318	746	4,140	5,458	2,292	2,625	1,620	1,670	2,272	722	1,024	843	282
1935	2,354	1,473	940	893	701	644	523	233	183	413	193	140	108
1934	132	155	164	190	194	155	168	148	118	517	357	206	142
1933	1,152	668	411	355	293	253	147	135	139	133	149	89	100

[1] Data from the Weekly Health Index, issued by the Bureau of the Census.
[2] Mississippi, Nevada, New York, Pennsylvania, Virginia excluded, data not available The District of Columbia is counted as a State

[3] Collins, Selwyn D Excess mortality from causes other than influenza and pneumonia during influenza epidemics. Public Health Reports, Nov. 11, 1932. (Reprint No 1553)

Considering both the mortality and the reported cases, it appears that, during February and March of 1936, (*a*) a minor influenza epidemic was in progress, and (*b*) the excess mortality was of the order of magnitude of that of the epidemic of December–January of 1932–33 and greater than in the epidemics of March 1932 and January 1935, which have been described in some detail in the Public Health Reports.[4] All of these epidemics, however, were distinctly less than that of 1928–29. The minor epidemic of February–March 1936 has apparently occurred almost without notice by the press or current medical literature.

Meningococcus meningitis.—For the country as a whole the incidence of meningococcus meningitis (1,169 cases) for the 4 weeks ended April 18 stood at about the level of the preceding 4-week period (1,172 cases). The total number of reported cases for the current period was about 1.8 times that for the corresponding period in 1935 and was the highest for this period since 1929, when there were 1,289 cases. In each geographic region, except the West North Central, the incidence was higher than it was at this time last year. States from which a large number of cases were reported were Kentucky, 146; Ohio, 92; Maryland, 71; and Texas, 55. In Virginia, where the disease has been unusually prevalent, the number of cases dropped from 116 for the preceding 4-week period to 44 for the current period. While the number of weekly cases is fluctuating considerably in the various geographic regions, and some States are still reporting increases, the general tendency appeared to be toward a decline.

Measles.—The number of cases of measles continued to increase. For the 4 weeks ended April 18 approximately 50,000 were reported. Compared with preceding years the number was less than 40 percent of that reported for the corresponding period in each of the years 1935 and 1934, when measles was unusually prevalent, and only about 70 percent of the average for the years 1929 to 1933, inclusive. The disease continued unusually prevalent in the Mountain and Pacific regions, where the number of cases (14,003) was 1.2 times that for last year and was the highest for this period since 1930. The North Central regions seemed mostly responsible for the decrease from the more normal years, as the incidence in those areas was the lowest in the 8 years for which data are available. The East North Central group of States reported 2,328 cases, as compared with an average of approximately 19,000 for nonepidemic measles years, and the West North Central group approximately 2,000, as compared with an average of about 5,500. In other regions the incidence was about normal for this season of the year.

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[4] Collins, Selwyn D., and Gover, Mary. Influenza and pneumonia mortality in a group of about 95 cities in the United States during four minor epidemics, 1920-35, with a summary for 1920-35. Public Health Reports, Nov. 29, 1935. (Reprint No. 1720.)

Smallpox.—The number of cases of smallpox reported for the 4 weeks ended April 18 was 878, as compared with 739, 656, and 815 for the corresponding period in the years 1935, 1934, and 1933, respectively. The high incidence was still confined to the West North Central, Mountain, and Pacific regions. While the incidence had declined considerably from that of the preceding 4-week period, each State in the West North Central region reported an increase over last year's figures for this period. For the current period Kansas reported 134 cases; Iowa, 129; South Dakota, 114; and Nebraska, 104. For the region as a whole the number of cases (584) was more than twice that for the corresponding period last year. Montana, with 41 cases, and Oregon, with 30 cases, kept the incidence in the Mountain and Pacific regions above that of recent years; but in other States in those regions where the disease has been unusually prevalent the incidence had dropped to a more normal level.

Scarlet fever.—The expected seasonal increase of scarlet fever was in progress; the number of cases reported for the current 4 weeks was 31,547, as compared with 35,311 for the preceding 4-week period. In relation to recent years the current incidence closely approximated that for the corresponding period in 1935; was about 25 percent above the figure for 1934, and more than 20 percent above the incidence in 1933. In the West North Central region (5,828 cases) and Mountain and Pacific regions (3,830 cases) the current incidence was the highest for this period in the 8 years for which data are available; in the South Central regions (1,035 cases) it was the highest in 5 years. The number of cases (965) reported from the South Atlantic region was the lowest in 7 years, and in the East North Central region the number was the lowest in 4 years. In the New England and Middle Atlantic regions the incidence (10,190 cases) was close to the average for recent years.

Typhoid fever.—The current incidence of typhoid fever was about on a level with that of recent years. For the 4 weeks ended April 18 there were 620 cases reported. Owing to the continued high incidence in Ohio (148 cases for the 4 weeks), the number of cases in the East North Central region was about 2.5 times that for the corresponding period in 1935. In the Mountain and Pacific regions the incidence closely approximated that of last year, while in other regions the number of cases fell considerably below that of last year. Of the 148 cases in Ohio, Mansfield reported 84.

Diphtheria.—The total number of reported cases of diphtheria for the current 4-week period was 1,808, as compared with 2,193 for the corresponding period in 1935 and about 2,500 in each of the 2 preceding years. The incidence was the lowest for this period in recent years in all sections of the country.

Poliomyelitis.—The number of cases (47) of poliomyelitis reported for the 4 weeks ended April 18 was the lowest for this period in the

6 years for which data are available. In 1935, 1934, and 1933 the numbers of cases for this period were 77, 91, and 54, respectively. In the South Atlantic region the current incidence stood at about the level of last year, but in all other regions it was somewhat below the seasonal expectancy.

Mortality, all causes.—The average mortality rate from all causes, in large cities, as reported by the Bureau of the Census, was 13.3 per 1,000 inhabitants (annual basis). For the corresponding period in the years 1935, 1934, and 1933 the rate was 12.0, 12.4, and 11.3, respectively.

A COMPARATIVE STUDY OF CERTAIN CHARACTERISTICS OF 1,000 INMATES OF THE NORTHEASTERN PENITENTIARY [1]

I. AGE

By Barkev S. Sanders, Ph.D., *Assistant Psychologist, United States Public Health Service*

The present comparative study of certain characteristics of 1,000 inmates, admitted to the Northeastern Penitentiary, Lewisburg, Pa., during the period December 12, 1932, to December 21, 1933, was undertaken to determine the traits which differentiate delinquents from nondelinquents. It is probable that the etiology of crime will be found in the realm of these differential traits.

Table 1.—*Statistical constants of age distribution of delinquents committed to State and Federal institutions compared with that of general male population* [1]

STATE INSTITUTIONS

Statistical constants	1926	1927	1929	1930	4-year aggregate	General male population (15 and over)
Mean (M)	28.81	28.83	28.99	28.70	28.77	38.40
Standard deviation (S. D.)	10.62	10.68	10.82	10.53	10.61	15.65
Median (Md)	25.81	25.76	25.89	25.64	25.72	36.49
First quartile (Q_1)	21.15	21.13	21.06	21.17	21.15	24.87
Third quartile (Q_3)	34.08	34.17	34.31	33.78	33.98	49.82
Interquartile range	12.93	13.04	13.25	12.61	12.83	24.95
Number of cases	35,352	36,089	46,106	52,487	170,034	43,829,205

FEDERAL INSTITUTIONS

Statistical constants	1926	1927	1929	1930	4-year aggregate	General male population (18 and over)	Northeastern Penitentiary
Mean (M)	33.80	33.35	32.62	33.52	33.55	40.40	34.45
Standard deviation (S. D.)	10.64	10.50	12.88	10.82	10.69	14.86	9.22
Median (Md)	31.74	31.56	31.32	31.59	31.62	38.36	33.14
First quartile (Q_1)	25.68	25.14	24.78	24.55	25.14	27.55	27.60
Third quartile (Q_3)	39.69	39.41	38.55	39.84	39.70	51.18	39.80
Interquartile range	14.01	14.27	13.77	15.29	14.56	23.53	12.50
Number of cases	5,009	4,728	9,307	9,413	28,457	40,385,487	1,000

[1] The year 1928 has been left out of many of our tables, since the census report for that year does not give the necessary information.

[1] Submitted for publication in January 1935.

As the rate of delinquency is greater in youth, age may have an etiological significance.

Table 1 shows the uniformity of age distribution of inmates sentenced to State and Federal penal and correctional institutions in the years 1926, 1927, 1929, and 1930. The statistical constants of the age distribution of the adult nondelinquent male population and those for the 1,000 Northeastern Penitentiary inmates are also given for comparison.

Table 1 demonstrates (*a*) the close uniformity of the ages of delinquents committed to State and Federal institutions in different years; (*b*) the preponderance of youthful persons among delinquents as compared with the nondelinquent population; and (*c*) the greater asymmetry of the age distribution of delinquents. The table also shows that while both the greater preponderance of young individuals and the greater asymmetry in the age distribution are evident in both State and Federal commitments, they are, nevertheless, more pronounced among State commitments and least so among the 1,000 inmates from Northeastern Penitentiary. The Federal commitments further suggest a progressive lowering of the average from year to year. A comparison of the average commitment age in 1923 with that shown in table 1 corroborates this tendency.

In table 2 the average annual commitments to State and Federal institutions, respectively, during the years 1926, 1927, 1929, and 1930 have been divided by the total population for each age period, giving relative rates of commitment.

TABLE 2.—*Commitment rates to State and Federal institutions according to age*

Age	State prisons and reformatories, rates per 10,000	Federal prisons, rates per 100,000	Northeastern Penitentiary, rate per 1,000,000	Age	State prisons and reformatories, rates per 10,000	Federal prisons, rates per 100,000	Northeastern Penitentiary, rate per 1,000,000
Under 15	0.2	0.1		30 to 34	10.5	26.6	50.0
15 to 17	6.4	2.8		35 to 39	7.5	21.5	36.8
Under 18	11.2	6.1		40 to 44	5.7	16.0	27.1
18	21.7	11.7	4.0	45 to 49	4.3	12.0	19.9
19	28.0	19.7		50 to 54	3.2	9.3	11.2
20	26.1	21.0		55 to 59	2.6	6.8	5.8
20 to 24	23.0	25.2	23.4	60 to 64	1.9	4.5	2.1
21 to 24	22.2	26.3		65 and over	1.0	2.1	1.5
25 to 29	16.4	29.3	45.9				

Here we have the characteristics which differentiate the age distribution of delinquents from that of nondelinquents.

It is of interest to know the effect that nativity and race, residence, nature of the crime, recidivism, and occupation may have on the age distribution of delinquents.

NATIVITY AND RACE

The comparison according to race and nativity shows a close resemblance in the percentage age distribution of native-born white and colored, admitted to State and Federal institutions during the period 1926 to 1930, inclusive. The age distribution of the foreign-born white, on the other hand, differs markedly from that of native-born whites. In ages below 25 the percentage of foreign born is one-half that of native born, while in ages above 35 this relation is reversed. A similar percentage comparison of ages of 1,000 inmates of the Northeastern Penitentiary, showed a relatively close resemblance in the age distribution of native-born whites and Negroes, though this resemblance was not as close as that observed for State and Federal commitments in general. There was a pronounced dissimilarity in the ages of native- and foreign-born whites among the inmates of Northeastern Penitentiary. The comparative age distribution of inmates according to race and nativity showed great consistency in different years.

Table 3 shows the comparative commitment rate of inmates according to age, nativity, and race. The absolute rates were obtained by dividing the number of commitments in the years 1926, 1927, 1929, and 1930 by the number of individuals in the population according to specific age, race, and nativity. The relative rates were obtained by considering the rate for all ages as one, and relating to this base the specific age rates for each nativity race group. The specific age rates of the Negro and the foreign-born whites were related to that of native-born whites to bring out more strikingly the differences in commitment rates of these groups at different ages. The table also shows rates of incarceration for the entire inmate population irrespective of nativity and race (columns 5 and 9).

TABLE 3.—*Rates of incarceration to State and Federal penal and correctional institutions per 10,000 population*

Age	Absolute rates				Relative rates				Negro over native-born white	Native-born white over foreign-born white
	Native-born white	Negro	Foreign-born white	Aggregate	Native-born white	Negro	Foreign-born white	Aggregate		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
15 to 19	49.8	113.1	69.0	57.0	1.16	1.05	3.63	1.28	2.27	0.72
20 to 24	91.0	200.0	63.1	100.9	2.13	1.88	3.32	2.26	2.20	1.44
25 to 29	67.2	178.2	38.3	75.8	1.57	1.68	2.02	1.70	2.64	1.75
30 to 34	46.4	129.9	30.2	51.8	1.09	1.22	1.59	1.16	2.81	1.54
35 to 39	35.2	91.5	22.8	38.0	.82	.86	1.20	.85	2.60	1.54
40 to 44	28.1	70.0	16.4	28.7	.66	.66	.86	.64	2.49	1.71
45 to 49	21.2	47.9	12.8	21.5	.50	.45	.67	.48	2.26	1.66
50 to 54	16.6	29.1	9.6	16.2	.39	.27	.51	.36	1.75	1.73
55 to 59	13.3	27.8	7.0	12.9	.31	.26	.37	.29	2.09	1.90
60 to 64	9.6	18.1	5.2	9.1	.22	.17	.27	.20	1.89	1.85
65 and over	4.8	11.1	2.6	4.6	.11	.10	.14	.10	2.31	1.85
All ages	42.7	106.2	19.0	44.6	1.00	1.00	1.00	1.00	2.49	2.25
Number of cases	138,304	42,362	13,308	193,974						

Column 10, $V=13.30$; column 11, $V=19.33$

The comparison of commitment rates for Negroes and native whites shows a consistently higher rate for Negroes at all ages, the ratios ranging from 1.89 to 2.81, with a weighted average ratio of 2.49. The unweighted mean ratio was 2.30, the standard deviation 0.306, and the coefficient of variation 13.30 (column 10).[3] The comparison of the relative rates (columns 6 and 7) according to age shows a close resemblance in the comparative rates of Negroes and whites of specific ages. The relative commitment rate of whites is somewhat greater in ages below 25 and above 45.

For native-born and foreign-born whites the comparison shows a higher commitment rate for native born at all ages above 20. The ratios in favor of the foreign born range from 1.44 to 1.90, except at ages 15 to 19. The weighted average ratio, irrespective of age, is 2.25 in favor of the foreign-born whites. The ratios given in column 11 show an average of 1.61, with a standard deviation of 0.313, and a coefficient of variation of 19.33. The variability of the ratios obtained from commitment rates of native- and foreign-born whites is greater than that for Negroes and native-born whites. This is borne out by columns 6, 7, and 8.

In comparing the commitment rates of foreign- and native-born whites the marked excess of foreign-born commitment rates in ages below 20 should not be overlooked. To the writer, this relatively greater commitment rate of foreign-born in ages below 20 appears to be of great sociological significance, especially when one takes into consideration the fact that several studies have shown the relatively greater commitment rates of first-generation Americans. These facts suggest the importance of cultural conflict in antisocial acts. In passing, it may be stated that the marked advantage in favor of the foreign-born is partly the result of their peculiar age distributions. Applying the rates shown in column 4 to the age distribution of the native population, we get an average commitment rate of 32.8 per 10,000 instead of 19.0 as shown in column 4.

A comparison of commitment rates according to age, nativity, and race for the 1,000 inmates, while of interest, cannot be more than suggestive, in view of the small number of cases and the complex selective factors which determine the decision of the court to send the inmate to Northeastern Penitentiary. Another difficulty is to find a parent population on the basis of which commitment rates may be computed. The 1,000 inmates sentenced to the institution represented 34 States. The majority of them (88.9 percent), however, were convicted in 9 States, including the District of Columbia. To obtain a base population, the age, nativity, and race composition of each of the 9 States were weighted in proportion to the percentage of inmates from each State, and combined. Using this base, commitment rates were

[3] The coefficient of variation is obtained by the formula $V=\frac{S.D.}{M}\times 100$.

computed for the 1,000 inmates. These rates, supplemented by relative rates and ratios of native whites and Negroes and native- and foreign-born whites are given in table 4.

TABLE 4.—*Rates of commitment to Northeastern Penitentiary per 100,000 population*

Age	Absolute rates			Relative rates			Negro over native-born white	Native-born white over foreign-born white
	Native-born white	Negro	Foreign-born white	Native-born white	Negro	Foreign-born white		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
15 to 19	0.5	1.6	0	0.08	0.12	0	3.20	----------
20 to 24	6.6	17.8	7.8	1.03	1.36	1.08	2.70	0.85
25 to 29	13.4	17.1	12.8	2.09	1.31	1 71	1.28	1.09
30 to 34	13.3	19.7	14.6	2.08	1.51	2.03	1.48	.91
35 to 44	8.6	15.9	9.2	1.34	1.22	1.28	1.85	.93
45 to 54	4.6	5.8	5.2	.72	.45	.72	1.26	.88
55 to 64	1.5	0	1.0	.23	0	.14	0	1.50
65 and over	.3	0	.9	.05	0	.13	0	.33
All ages	6 4	13.1	7.2	1.00	1.00	1.00	2.05	.89

The maximum commitment rates for native whites, Negroes, and foreign-born whites are 13.1, 19.7, and 14.6, respectively. The weighted average rates are 6.4, 13.1, and 7.2. The commitment rate of the Negro is again more than twice the rate of the native whites; but, unlike that in table 3, the commitment rate of the foreign-born is somewhat higher. The standardization of the age distribution of the foreign-born, according to that of the native-born, lowers the commitment rate of the foreign-born to 6.4 per 100,000. Furthermore, the elimination of 31 cases convicted for the violation of the Federal Immigration Act, a crime not duplicated by native-born, lowers the commitment rate of the foreign-born to 5.6. This is lower than the rate for native-born whites, even though the margin of difference is rather small, especially when compared with the marked difference seen in table 3. The approximate parity of the crude commitment rate of native- and foreign-born whites is confirmed by conviction statistics of New York State for the year 1931. The conviction rate of Negroes in New York, however, is higher than that in tables 3 and 4. These rates are 173.6, 178.1, and 961.8 per 100,000 for native-born whites, foreign-born whites, and Negroes, respectively.[3]

The comparison of relative rates of native- and foreign-born and Negroes in tables 3 and 4 shows a marked difference. The excessive rate of commitment of the foreign-born in ages below 20 does not appear in table 4. The relative commitment rates with respect to age for the Negro and the white do not resemble each other as they do in table 3. The coefficients of variation obtained from columns 8 and 9 were far in excess of those obtained from comparable columns

[3] Second Annual Report of the Commission of Correction of Crime Statistics for the Year 1931. Feb. 15, [illegible], table 23, pp. 139-140.

(10 and 11) of table 3. The wide disparity in the relative commitment rates of Negroes and native-born whites may be attributed in part to the fact that the northern Negro is, in a measure, an immigrant group. The differences found in tables 3 and 4 are probably real and likely to be substantiated by more extensive data. In both tables 3 and 4 for each race and nativity group we find a preponderance of youthful commitments and a greater concentration of ages toward the lower limit. In other words, nativity and race do not account for the differential age distribution of inmates of penal and correctional institutions.

RESIDENCE

Several studies have shown that crime rates vary in different regions. A comparative study of the age distribution of inmates in each of the States of the Union showed no consistent local variation. On the contrary, it brought out forcibly the characteristics pointed out in section 1 of this paper. This fact is borne out by a similar study for the inmates of Northeastern Penitentiary, limited to the States of New York, Pennsylvania, Ohio, and New Jersey, from which there were enough inmates to make the comparison valid. These comparative studies showed the average relation between the age distribution of delinquent and nondelinquent population to be rather negligible. Thus the correlation of median ages of inmates and the population in each of the States of the Union gave a coefficient of 0.116. Similarly low coefficients were obtained by correlating other statistical constants of the two sets of age distributions. In industrial States such as Massachusetts and Connecticut, with a relatively larger population of industrial age (some of it migratory from neighboring regions), the distribution of ages of inmates gives a relatively lower first quartile, an even lower median, and a still lower third quartile, resulting in a smaller interquartile range. This tendency is reflected somewhat in the age distribution of inmates, as shown by the fact that correlation of interquartile ranges for inmates and nondelinquent population in the different States gives a coefficient of 0.24.

The variability of the age distribution of delinquents in the different States was not much greater than that of the nondelinquent population. For instance, the variability of median ages among delinquents was 7.85, and among nondelinquents, 5.37. Similar results were obtained by comparing the variability of other constants in the two sets of statistics. The variability of ages of Federal inmates from different States appeared more stable; suggesting thereby that the greater age variability in State commitments results from differences in criminal law and the effectiveness of its enforcement.

To investigate the influence that the size of community may have on crime rate, we studied the commitment statistics of New York State in 1931. The correlation between size of community and rate of commitment was low. The apparent results probably underestimate the true relation, since statistics give us almost always the nominal residence or the place of apprehension, both of which may be sociologically erroneous. The analysis showed an underestimate of crime rates in our larger metropolitan areas. This is due to the fact that criminals operating in these areas are more likely to have their legal residence and their hide-out places at the outskirts of metropolitan regions. In the case of White Plains, N. Y., it was found that the annual crime rate for 1931 was 2,706.6 per 100,000, while for New York City the rate was 174.8, and the median rate for cities of the size of White Plains was 177.0. On the basis of this analysis it is believed that the crime rate in different communities is influenced by many factors, among which are efficiency of local police, proximity to metropolitan areas, and transportation facilities. The influence of these factors may completely overshadow any interrelation that may exist between the size of community and crime rate.

The relative distribution of ages of those committed from communities of different sizes is shown in table 5, based on the 1,000 cases of Northeastern Penitentiary. The absolute rates were obtained from a base using the population of the nine States which contributed 88.9 percent of our cases, combined after weighting each with the percentage of inmates contributed. The relative rates were obtained by equating the weighted average rates to one and relating the specific age rates to this base.

TABLE 5.—*Rates of commitment to Northeastern Penitentiary per 100,000 population according to density of population and age on commitment*

Age	Absolute rates				Relative rates			
	500,000 and over	100,000 to 499,999	2,500 to 99,999	Less than 2,500	500,000 and over	100,000 to 499,999	2,500 to 99,999	Less than 2,500
15 to 19	0.14	0.04	0	0.02	0.11	0.06	0	0.08
20 to 24	.96	.86	.62	.40	.77	1.24	1.38	1.60
25 to 29	2.30	1.25	.81	.64	1.89	1.81	1.80	2.56
30 to 34	2.50	1.40	.78	.45	2.05	2.02	1.73	1.80
35 to 44	1.56	.88	.59	.37	1.28	1.26	1.31	1.48
45 to 54	.83	.44	.35	.16	.68	.64	.78	.64
55 to 64	.18	.18	.13	.02	.15	.26	.29	.08
65 and over	.12	.07	0	.03	.10	.10	0	.12
All ages	1.22	.69	.45	.25	1.00	1.00	1.00	1.00
Coefficient of variation (V)					83.65	78.25	76.76	84.96

Table 5 shows a progressive and marked increase in the commitment rates with the size of community. Because of the small number of cases, this evidence cannot be considered more than suggestive. If more extensive statistics showed as close a correlation between the

size of community and the rate of Federal commitments, it would suggest the efficiency of local police to be the important variable which obscures the interrelation between size of community and crime rate. The relative commitment rates at different ages for communities of different sizes show no great variations. The coefficients of variation are very much the same. There is, however, a progressive change which might be significant. The rates for communities of 500,000 and over increase slowly at first, reaching a maximum at ages 30 to 34 and from there declining rather sharply. For communities of smaller size the initial rates increase more rapidly, reach a maximum earlier, but decrease somewhat slowly. This tendency is most marked for communities of less than 2,500 population. This may suggest the tendency of criminals to move to larger metropolitan areas subsequent to their early conflicts with the law. The standardization of age distribution of population in communities of various sizes so as to conform with that found in communities of 500,000 and over does not alter significantly the relations shown in table 5.

The most outstanding fact in our analysis of ages of inmates of penal and correctional institutions is that, despite minor variations from State to State and from one community to another, the essential characteristics of age distribution of inmates remain the same, indicating that, as far as our evidence goes, these characteristic features are not influenced significantly by residence.

RECIDIVISM

We have found so far that nativity, race, and place of residence do not account for the unique age distribution of inmates. It is of interest to study the extent to which the age distribution of first offenders and recidivists varies inter se.

TABLE 6.—*Percentage distribution of ages of first offenders and recidivists*

Age	Inmates of State and Federal institutions						Northeastern Penitentiary		
	1926			1927					
	First offense	Recidivists	Difference	First offense	Recidivists	Difference	First offense	Recidivists	Difference
15 to 17	4.9	3.6	+1.3	5.5	3.7	+1.8	0.6	1.3	−0.7
18	5.7	4.6	+1.1	5.6	3.8	+1.8			
19	7.2	5.9	+1.3	6.8	5.1	+1.7			
20	6.7	5.8	+.9	6.0	5.1	+.9	10.7	14.6	−3.9
21 to 24	20.6	21.0	−.4	20.7	21.1	−.4			
25 to 29	18.2	21.6	−3.4	17.1	21.1	−4.0	22.3	22.3	0
30 to 34	11.7	13.0	−1.3	11.8	14.0	−2.2	20.6	25.0	−4.4
35 to 39	9.0	9.7	−.7	9.4	10.1	−.7	17.2	17.2	0
40 to 44	6.1	6.1	0	6.6	6.2	+.4	13.7	8.4	+5.3
45 to 49	3.8	3.7	+.1	4.4	3.8	+.6	8.6	5.8	+2.8
50 to 54	2.9	2.3	+.6	2.6	2.6	0	3.2	3.9	−.7
55 to 59	1.5	1.3	+.2	1.7	1.6	+.1	1.7	1.1	+.6
60 to 64	.8	.8	0	1.0	1.0	0	.8	0	+.8
65 and over	.9	.6	+.3	.8	.8	0	.6	.4	+.2
Number of cases	17,040	14,021		18,863	14,869				

We find that the age distribution of first offenders is essentially the same as that of recidivists. In fact, with recidivists the differential age distribution, characteristic of inmates of penal and correctional institutions, is more pronounced. This is of great importance, since, on the average, recidivists are the more confirmed delinquents. The comparative age distribution of first offenders and recidivists would indicate that, on the average, a younger first offender has a greater likelihood of becoming a repeater than an older first offender. This fact is of great importance for parole and in efforts toward rehabilitation.

The more marked characteristic deviation of the age distribution of recidivists is reflected in almost all crimes.

TABLE 7.—*Quartile age distribution of commitments to State and Federal institutions in 1926, according to the type of crime and recidivism*

Offense		Median	First quartile	Third quartile	Interquartile range
All offenses	First offenders	26 32	21 12	35 00	13 88
	Recidivists	27.12	21 97	34 81	12 84
Homicide	First offenders	31 56	25 33	41 16	15 83
	Recidivists	30 69	25 37	39 26	13.89
Rape	First offenders	27 05	21 61	38 37	16 76
	Recidivists	27 00	21 86	36 56	14 95
Robbery	First offenders	22 87	19 97	27 30	7 33
	Recidivists	24 75	21 65	29 50	8 35
Assault	First offenders	28 63	23 43	38 53	15 10
	Recidivists	29 34	24 38	37 06	12 68
Burglary	First offenders	22 69	19 58	28 02	8 44
	Recidivists	25 28	20 89	31 80	10 91
Forgery	First offenders	26 55	21 67	33 98	12 31
	Recidivists	28 69	23 27	37 23	13 96
Larceny and related offenses	First offenders	24 37	20 34	31 84	11 50
	Recidivists	24 89	20 77	31 67	10.90
Embezzlement	First offenders	33 26	27 57	42 11	14 54
	Recidivists	81 25	26 18	87 95	11 77
Fraud	First offenders	34 30	26 85	42 73	15 88
	Recidivists	34 78	26.22	42 63	16.41
Having stolen property	First offenders	23 85	20 37	29 28	8.91
	Recidivists	24 89	21 45	30 25	8.80
Larceny	First offenders	23 15	19 85	24 89	9 04
	Recidivists	24 34	20 39	30 40	10 01
Sex offenses	First offenders	33 03	25 99	42 63	16 94
	Recidivists	33 53	25 99	43 04	17 05
Violation of liquor laws	First offenders	36 69	28 54	45 46	16 92
	Recidivists	36 38	28 44	46 44	18.00
Violation of drug laws	First offenders	33 32	27 29	41 10	13 81
	Recidivists	34 15	28.48	41 00	12 52
Carrying weapons	First offenders	25 76	21 19	32 57	11 38
	Recidivists	27 90	23 39	34.40	10.97
Nonsupport and neglect of family	First offenders	31 12	25 63	37 96	12 33
	Recidivists	33 75	27 83	40 08	12 25
Other offenses	First offenders	27 17	20.87	35 83	14.96
	Recidivists	27 92	21 94	38 10	16.16
Coefficient of variation (V)	First offenders	15 06	13 14	15 66	23 74
	Recidivists	13 24	11 42	12 85	21.59
Coefficient of correlation (r) for first offenders and recidivists.		.99	.96	.96	.88

The age distribution of recidivists is relatively more concentrated, as indicated by the generally lower interquartile ranges. The consistently lower coefficients of variation for recidivists indicate that their age distribution is somewhat more consistent in different crimes. But above all, the most pronounced indication is the close similarity of the age distribution of first offenders and recidivists convicted for

the same crime. This close resemblance is reflected in the unusually high coefficients of correlation obtained by correlating various statistical constants obtained from the age distribution of first offenders and recidivists convicted for respective crimes.

Crimes in which the proportion of recidivists is less tend to have a higher average commitment age. For instance, correlating the median ages in table 7 with the percentage of first offenders reported for each crime gave a coefficient of 0.49. There is also some positive correlation between the median age and the number of commitments for a given offense.

The comparative age distribution of first offenders and recidivists according to the number of prior commitments is shown in table 8.

TABLE 8.—*Age distribution of inmates admitted to State and Federal penal and correctional institutions in 1926 and 1927, according to recidivism*

Prior commitment	Median	First quartile	Third quartile	Inter-quartile range	Number of cases
No previous commitment	26.49	21.17	35.50	14.33	35,970
No previous commitments to prisons, or reformatories, but to jails	24.82	20.58	32.20	11.62	10,105
One prior commitment only	24.42	20.34	31.65	11.31	6,796
Two prior commitments	25.40	20.79	32.87	12.00	2,054
Three or more prior commitments	26.69	21.93	33.50	11.57	1,255
Previous commitment to prison or reformatory	28.51	23.23	33.69	13.46	18,829
One prior commitment only	27.30	22.43	34.48	12.05	12,414
Two prior commitments	29.75	24.54	37.61	13.07	4,087
Three or more prior commitments	35.14	28.06	44.14	16.08	2,328

Recidivists who have served prior sentences in jails are, on the average, younger than first offenders, regardless of the number of previous jail commitments. Also the age distribution is more concentrated for recidivists who have served prior prison or reformatory sentences; even though somewhat older than first offenders, the age difference is much less than normally expected. Recidivists with prior prison sentences show a lower proportion in the higher ages and a smaller interquartile range.

Table 9 gives the quartile age distribution of 1,000 inmates according to the number of prior offenses.

TABLE 9.—*Quartile distribution of ages of inmates confined in Northeastern Penitentiary according to recidivism*

Recidivism	Median	First quartile	Third quartile	Inter-quartile range
First offense	33.96	28.09	41.27	13.18
Recidivists	32.35	27.04	38.41	11.37
Second offense	32.58	26.65	38.81	12.16
Third offense	31.97	27.28	37.29	10.01
Fourth offense	32.04	27.30	39.19	11.89
Fifth offense or more	32.50	27.64	39.25	11.61

Regardless of the number of former commitments, the recidivists have a lower average age, a relatively smaller proportion of older men, and a smaller interquartile range.

Our analysis of the age distribution of recidivists and first offenders shows that deviations in the age distribution characteristic of inmates of penal and correctional institutions are more accentuated among recidivists.

TYPE OF CRIME

The age distribution of inmates committed for different crimes came up incidently in the preceding section; however, the problem is of sufficient significance to receive a more careful analysis.

Table 10 gives the quartile age distribution of offenders committed to State and Federal institutions in the years 1926, 1927, 1929, and 1930, and arrests in New York State for 1930 and 1931, according to crime.

TABLE 10—*Quartile distribution of ages, asymmetry, and percentage of cases according to the type of crime*

Offense	State and Federal institutions						New York State arrests		
	Median	First quartile	Third quartile	Interquartile range	$\frac{Md-Q_1}{Q_3-Md}$	Per cent	Offense	Average median	Per cent
Homicide	30 17	24 05	39 77	15 72	1 51	4 28	Homicide.	29 80	2 02
							Homicide auto	20 40	3 06
Rape	27 86	22 07	38 76	16 69	1 88	2 74	Rape	23 85	4 37
Robbery	23 49	20 32	28 24	7 92	1 50	7 65	Robbery	23 40	11 60
Assault	29 19	23 47	38 24	14 77	1 58	3 62	Assault	31 05	17 07
Burglary	23 66	19 96	29 51	9 55	1 58	14 38	Burglary	22 95	14 37
Forgery	27 48	22 33	35 81	13 48	1 62	5 22	Forgery	29 80	2.41
Larceny and related offenses	24 30	20 32	31 33	11 01	1 77	20 75			
Embezzlement	33 96	27 32	42 73	15 41	1 32	73			
Fraud	33 65	26 26	42 38	16 12	1 18	1 33			
Receiving stolen property	23 67	20 13	29 30	9 17	1 60	2 67	Receiving stolen property	33.05	1 62
Larceny	23 76	20 04	29 79	9 75	1 63	16 05	Larceny	30 25	11 66
							Larceny (auto)	20 30	10 30
Sex, not rape	32 48	25 20	42 35	17 15	1 36	1 84	Sex etc	29 25	2 40
Violation liquor laws	34 61	26 93	44 26	17 33	1 26	8 09			
Violation of drug laws	34 66	28.00	41 71	13 71	1 06	2 93			
Carrying weapons	26 88	22 25	33 54	11 29	1.44	64	Other felonies	30.35	3 21
Nonsupport or neglect family	33 19	27 33	39 88	12 65	1 14	97	Family and children	32.85	1.63
Others	28.51	22 23	38 63	16 40	1 61	5 85	Intoxicated when driving	38.00	21
Not reported	26 98	21 15	35.23	14 08	1 42	26	Misdemeanor sec 552	29 20	11 06
							Fugitives	31 45	2 49
							Arson	35 55	52
Number of all cases	148,619							52,522	

A wide variation in the age distribution of offenders charged with different crimes is apparent, and the variation remains rather constant from year to year. There is a marked association between a low median age, a smaller interquartile range, and a more asymmetrical distribution of the cases around the median. State and Federal offenders with the lowest median age, lowest interquartile range, and greatest asymmetry about the median are convicted for

robbery, burglary, having stolen property, larceny, and carrying weapons, crimes which may be characterized as violent and impulsive. On the other hand, offenders with the highest median age, greatest interquartile range, and lowest asymmetry about the median, are convicted for violation of drug laws, violation of liquor laws, embezzlement, fraud, and nonsupport or neglect of family, which may be characterized as not violent nor impulsive, in some instances technical crimes. The first set of 5 crimes contributed 41.39 percent, and the second set 14.05 percent. The first set of crimes are most prevalent among State commitments, while the second set are more prevalent among Federal commitments. This fact is largely responsible for the more advanced age and relatively wider interquartile range of Federal commitments.

In New York the lowest median ages are found among arrests for larceny (auto), burglary, robbery, rape, and misdemeanor (section 552), which are the more impulsive and violent crimes. The highest median ages are found among arrests for intoxication while driving, arson, receiving stolen property, family and children (nonsupport), and fugitives. Compared with the first set of crimes the latter are less violent and direct. The first set of arrests in New York State constituted 51.70 percent, the second 6.46 percent. A comparison of the arrest experience of New York State with the State and Federal commitments shows substantial agreement. This agreement is not as close as it might be, since we are comparing arrests with commitments, since the census data throws together both State and Federal commitments, and since, despite the wide diversity in the criminal law and procedure in different States, the Census Bureau groups crimes under relatively few major captions.

Table 11 shows the age distribution of the 1,000 inmates of Northeastern Penitentiary according to crime. The last caption, "All others", includes all offenses with less than 10 offenders.

TABLE 11.—*Quartile age distribution of 1,000 inmates of Northeastern Penitentiary according to offense and percentage of cases committed for each offense*

Offense	Median	First quartile	Third quartile	Inter-quartile range	$\frac{Md-Q_1}{Q_3-Md}$	Percent
Bank act	39.64	33.19	49.46	16.27	1.37	3.9
Bankruptcy	42.86	38.75	46.67	47.87	.93	2.0
Counterfeiting	32.14	27.35	38.48	11.13	1.22	33.6
Dyer act	28.25	23.34	34.00	10.60	1.17	6.0
Forgery	36.67	32.14	41.67	9.53	1.10	2.4
Immigration	28.63	25.23	33.21	7.98	1.35	3.0
Impersonation	37.08	30.31	44.69	14.38	1.12	2.1
Interstate commerce	31.67	21.33	38.33	17.00	.64	1.6
Mail theft	31.67	27.19	37.50	10.31	1.30	2.6
Mann act	28.75	25.88	34.06	8.18	1.85	2.3
Narcotics	35.20	29.74	39.80	10.06	.84	9.2
Post office theft	37.50	21.67	34.37	12.70	1.18	1.2
Postal laws	36.53	30.52	40.36	9.84	.93	3.4
Prohibition	34.41	27.19	39.78	12.59	1.93	9.4
Robbery	22.67	21.33	25.20	3.87	1.89	1.2
All others	35.66	30.53	41.07	10.54	1.06	4.8

Offenders with the lowest median age are those convicted for robbery, post office theft, violation of the Dyer act, immigration act, Mann act, and mail theft. The interquartile ranges for these crimes are among the lowest, and asymmetry among the highest, even though the association in this case is not as close as in table 10. The six crimes mentioned contributed 21 percent of the convictions, and, perhaps with the exception of the immigration act, they may all be regarded as the more violent and direct crimes against the Federal Government. The crimes of offenders with the highest median age and lowest asymmetry are violation of the Bankruptcy and Bank Acts, impersonation, forgery, postal laws, and narcotics. These crimes may be characterized as less violent, less direct, and more technical; they contributed 28 percent of the convictions. Tables 10 and 11 both indicate that crimes with the lowest median age, smallest interquartile range, and greatest asymmetry around the median tend to be the more violent and direct; while those with the highest median age, largest interquartile range, and least asymmetry tend to be the less violent, the more indirect, and more technical crimes. In fact, if it were not for the complication introduced by occupation, one might use the size of interquartile range and the degree of asymmetry in age distribution as an index of differentiation of offenders from general population. Our analysis of age distribution according to crime has shown that characteristics of relative youthfulness, a greater concentration of ages, and a less symmetrical age distribution generally hold true for all offenders. These characteristics are most pronounced in crimes distinguished by violence and directness, and they are least apparent in the less direct and more technical crimes.

OCCUPATION

There is evidence that incidence of crime varies in different occupational groups The influence of occupation upon behavior may be conditioned largely by such factors as income, associates, social status, mobility, contact with public, seasonality of occupation, permanency of occupation, occupational ethics, occupational maladjustments, legal restrictions, and occupational selection.

Studies of occupational distribution of prisoners are rare, because of the inherent difficulties involved. Despite these difficulties it is believed that a study of occupational distribution of inmates is important enough to warrant every effort. For our standard we took the occupational distribution of males, 18 years old and over, in the States of New York, Pennsylvania, Ohio, and New Jersey, according to the United States Census of 1930. Seventy-four percent of the inmates were derived from these four States. The occupations of the 1,000 inmates were grouped so as to agree with the Census Bureau list of occupations for the four States. The occupational distribu-

tion among the inmates was compared with the adopted standard and those occupations which showed a marked excess or deficiency are listed in table 12 with occupational distribution for the entire 1,000 inmates grouped in 10 major occupational pursuits.

TABLE 12.—*Occupational distribution of 1,000 inmates of Northeastern Penitentiary compared with that of the male population of 18 years and over in the States of New York, Pennsylvania, Ohio, and New Jersey*

Occupation	Theoretical expectation	Actual	Difference	S. D. / Difference
General and not specified labor	15.658	74	+58.342	+15.25
Bankers and bank officials	2.266	21	+18.734	+12.46
Wholesale dealers, import and export	3.107	23	+19.893	+11.30
Owners, and managers, truck, transfer, and cab companies	1.174	13	+11.826	+10.92
Barbers, hairdressers, and manicurists	7.579	33	+25.421	+9.27
Servants	12.360	41	+28.640	+8.64
Pressmen and plate printers	1.698	13	+11.302	+8.57
Brokers, commercial loan, and not specified	1.690	10	+8.310	+6.40
Waiters	6.660	23	+16.340	+6.35
Postmasters	.352	4	+3.648	+6.15
Bakers	5.127	18	+12.873	+5.70
Mechanics	20.240	45	+24.760	+5.56
Civil engineers and surveyors	3.182	12	+8.818	+4.95
Chauffeurs, truck, and tractor drivers	33.805	62	+28.195	+4.93
Tailors	7.747	21	+13.253	+4.78
Bookkeepers and cashiers	8.331	19	+10.669	+3.71
Salesmen	46.379	70	+23.621	+3.55
Musicians, teachers of music	3.321	9	+5.679	+3.12
Saw and planing mills, labor	.984	4	+3.016	+3.04
Forestry and fishing, all other occupations	.713	3	+2.287	+2.71
Restaurant, cafe, and lunchroom keepers	3.890	9	+5.110	+2.60
Officials and inspectors (U. S.)	.786	3	+2.214	+2.50
Actors and showmen	1.878	5	+3.122	+2.28
Plumbers, gas and steam fitters	9.303	16	+6.697	+2.21
Mail carriers	3.117	7	+3.883	+2.20
Technical engineers	8.935	15	+6.065	+2.04
Physicians and surgeons	4.245	0	−4.245	−2.06
Laborers, public service	4.397	0	−4.397	−2.10
Deliverymen, bakeries and stores	4.520	0	−4.520	−2.13
Brick, tile, and glass industries	4.969	0	−4.969	−2.23
Laborers, porters, and helpers in stores	5.219	0	−5.219	−2.29
Policemen	5.295	0	−5.295	−2.31
Guards, watchmen, and doorkeepers	5.470	0	−5.470	−2.35
Agents, collectors, and credit men	5.498	0	−5.498	−2.35
Commercial travelers	5.817	0	−5.817	−2.42
Iron and steel machinery and vehicle industry (operators)	20.914	10	−10.914	−2.47
Clerks in stores	6.787	0	−6.787	−2.61
Apprentices, building and hand trades	.706	0	−.706	−2.65
Managers and officials, manufacturing	10.321	2	−8.321	−2.65
Compositors	6.979	0	−6.979	−2.66
Retail dealers	50.546	32	−18.546	−2.72
Carpenters	27.311	13	−14.311	−2.78
Engineers, stationary	8.468	0	−8.468	−2.92
Insurance agents, managers and officials	8.550	0	−8.550	−2.94
Machinists	23.046	8	−15.046	−3.17
Foremen, overseers, manufacturing	10.919	0	−10.919	−3.32
Laborers (industrial)	85.513	14	−71.513	−4.57
Farm laborers, wage workers	28.554	0	−28.554	−5.42
Operatives	87.618	25	−62.618	−7.00
Farmers, owners and tenants	49.709	0	−49.709	−7.33
Major groups				
Domestic and personal service	56.408	150	+93.592	+12.83
Forestry and fishing	1.513	5	+3.487	+2.84
Clerical occupations	73.060	91	+17.940	+2.18
Trades	155.333	176	+20.667	+1.80
Professional service	54.609	67	+12.371	+1.72
Transportation and communication	108.314	124	+15.686	+1.60
Public service	25.269	8	−17.269	−3.46
Extraction of minerals	33.742	11	−22.742	−3.98
Manufacturing and mechanical industries	409.587	344	−65.587	−4.23
Agricultural	82.165	24	−58.165	−6.70

The first column gives the number in a given occupation per 1,000 males in the States of New York, Pennsylvania, Ohio, and New Jersey. The second column shows the number of inmates pursuing this same occupation. The third column gives the difference between the figures in columns 1 and 2, and the fourth column gives this difference in terms of the standard deviation of the difference. The occupations are arranged in order of the size of difference divided by standard deviation. Occupations showing a plus or minus difference of less than 2 S. D. are not shown in the table. Occupations showing an excess of 3 S. D. or more are general and nonspecified labor, bankers and bank officials, etc., down to and including saw and planing-mill laborers. These occupations are followed by about 182 persons per 1,000 males of the 4 States, while among the 1,000 inmates 515 persons report them as their occupations. Occupations with an excess of 2 S. D. or more are followed by 210 civilians and 573 inmates. Occupations which show less than their quota among inmates begin with physicians, with a difference of −2.06 S. D. and end with farmers, owners, and tenants with a difference of −7.33 S. D. Among the civilian population 471 pursue these occupations, while among inmates only 104 reported them as their occupations. Occupations showing a difference of −3 S. D. or more are followed by about 285 civilians out of every 1,000 employed males, and were reported by only 45 inmates.

At the end of table 12 the occupations of the 1,000 inmates are given according to the major occupational groupings used by the Bureau of the Census. The occupations reported by inmates are compared with occupational distribution of nondelinquents in the 4 States. Among inmates the occupations of domestic and personal service, forestry and fishing, clerical occupations, trade, professional service, and transportation and communications are more often reported than among nondelinquents; while occupations of public service, extraction of minerals, manufacture and mechanical industries, and agriculture are reported with less frequency. Particularly striking is the excessive number of inmates reporting occupations classified under domestic and personal service. Among nondelinquents 56 persons out of 1,000 follow these pursuits; 150 inmates report these occupations.

We feel that the differences shown in table 12 are generally significant, where the difference exceeds ±3 S. D. These differences are accountable in terms of socio-economic, legal, and other factors associated with different occupational pursuits.

Table 13 shows the age distribution of inmates according to occupation reported, as compared with the age distribution of nondelinquents reporting the same occupations. Only those occupations are given which were reported by at least 10 inmates. The age distribution of all inmates is shown in terms of major occupational groupings. The

table is arranged according to the size of difference in the interquartile range of ages for nondelinquents and the interquartile range of delinquents for each occupation.

TABLE 13.—*Quartile distribution of ages of 1,000 inmates of Northeastern Penitentiary compared with that of employed male population of 18 years old and over in the States of New York, Pennsylvania, Ohio, and New Jersey*

Occupation	Median		First quartile		Third quartile		2-Q range		Difference, 2-Q range
	Civilian	Inmates	Civilian	Inmates	Civilian	Inmates	Civilian	Inmates	
General and not specified labor	41 03	32 81	28.57	26.83	54 27	38.19	26.00	11.36	−14.64
Painters, glaziers, varnishers (building)	40 36	30.00	20 47	26.94	51 22	34.58	20.75	7.64	−13.11
Iron and steel machinery and vehicle industries (operators)	35 98	31 00	26 73	26.25	45 89	33.50	19 16	7 25	−11 91
Bakers	37 59	38 61	27 57	26.39	48 08	35 00	20.51	8.61	−11 90
Barbers, hairdressers, manicurists	38.85	33 86	29 48	30 11	49 49	38 59	20.01	8.48	−11 53
Operatives	35 67	31 39	25.96	25 21	46 64	34 86	20 68	9 55	−11 13
Transportation, other occupations	38 67	33 25	29 17	28 75	49 29	38 04	20 12	9 29	−10 83
Porters, except in store	38 06	30 00	28 71	25 83	49 15	38 75	23 32	12 92	−10 40
Domestic and personal, all other occupations	38 06	33 33	28.01	26 78	49 79	38 93	21 78	12 15	−9 63
Salesmen	34 32	34 52	26.60	30 36	44 47	39 31	17 87	8 95	−8.92
Clerks, except in store	30 32	30 63	23 06	25 19	41 69	35 28	18 63	10 09	−8.54
Wholesale dealers, import and export	43 36	42 50	35 46	38 12	52 75	47 25	17 29	9 13	−8 16
Servants	37 08	36 00	28 04	30 28	47 45	41 56	19 41	11 28	−8 13
Other industries (labor)	36 96	28 33	26 60	25 42	47 47	38 75	20 67	13 13	−7 34
Technical engineers	37 79	35 83	29 49	29 58	48 87	42 08	19 38	12 50	−6.88
Plumbers, gas- and steam-fitters	36 79	31 00	28 14	23 75	46 01	35 00	17 87	11 25	−6 62
Chauffeurs, truck and tractor drivers	31 03	29 17	25 61	25 94	38 75	33 59	13 14	7 65	−5 49
Electricians	32 69	31 50	26 14	27 19	41 50	37 08	15 36	9 89	−5.47
Brokers, commercial loan and not specified	41 36	34.00	32 18	31 50	51 91	45 83	19 73	14 33	−5 40
Retail dealers	42.30	35 00	33 89	30 00	52 37	43 33	18 48	13 33	−5 15
Civil engineers and surveyors	37 22	37 50	28 92	30 00	47 14	43 33	18 22	13 33	−4.89
Bookkeepers and cashiers	30 75	34 58	27 23	30 62	41 86	40 42	14 63	9 80	−4.83
Tailors	44 20	30 62	36 36	26 61	53 16	38 75	16 80	12 14	−4 66
Accountants and auditors	34 98	42 49	28.09	36 87	43 98	48.13	15 89	11 26	−4.63
Waiters	34 61	32 50	27 14	26 75	43 23	39 06	16 09	12 31	−3 78
Mechanics	32 92	29 81	26 09	25 48	42.02	37 75	15 93	12 27	−3.66
Bankers, brokers, and money lenders	40 75	45 36	31 90	33 39	51 12	52 08	19 21	18 69	− 52
Bankers and bank officials	43.29	48 12	34 54	36 56	54.04	55 75	19 50	19 19	− 31
Owners, managers, truck, transfer and cab companies	40 26	28 13	32.28	24 06	49 40	41 25	17 02	17 19	+ 17
Pressmen and plateprinters	35 71	33 75	26 99	25 62	45.42	44 58	18 43	18 96	+ 53
Carpenters	43 55	37 50	33.63	27 81	54 12	49 38	20.49	21.57	+1 08
Major groups									
Agricultural	45 50	30 00	32.21	25 71	58 12	37 50	25 91	11 79	−14.12
Transportation and communication	36 26	30.65	27 77	26 54	46 89	36 11	19 12	9 57	−9 55
Professional service	37 44	33 47	28 74	28.67	50.03	41 13	21 29	12.46	−8.83
Domestic and personal service	39 37	34.69	26 57	28 71	50.41	40 57	20 84	11 86	−8 78
Manufacturing and mechanical industries	38 36	31 88	28.47	26.61	49 14	38 66	20 67	12 05	−8.62
Trades	38 45	37 14	29 05	31 63	49 27	45 54	20.22	13 91	−6.31
Clerical occupations	31.17	32 49	23 47	26.99	42 51	45 13	19 04	18 14	− 90
Extraction of minerals	38.49	41 25	28 33	28 75	48.56	48.12	20 23	19 37	− 86

The table shows that, with few exceptions, the distribution of ages of inmates is characterized by a lower median, a smaller interquartile range, and greater asymmetry of ages around the median, typical of age distribution of inmates. Moreover, a standardization of occupational distribution of inmates according to that of nondelinquents showed no significant change in the age distribution. This indicates that the unique age distribution of inmates cannot be accounted for in terms of occupational selection, although there are wide variations in the age distribution of inmates pursuing different occupations. These variations indicate that occupations which are under the surveillance of the law, and therefore more subject to technical crimes, tend to have an age distribution among delinquents which approximates that of nondelinquents.

The occupational distribution of inmates also shows a marked interrelation between specific crimes and occupations. This is brought out in table 14, where the occupations showing a difference of ± 3 S. D. in table 12 are classified according to the nature of the crime.

Of the inmates reporting occupations of bankers and bank officials, 90.5 percent were convicted for violation of the Bank Act, and of those reporting the occupations bookkeepers and cashiers, 57.9 percent were convicted for violation of the Bank Act; on the other hand, only 3.9 percent of the total inmate population was convicted on this charge. Of the entire inmate population, only 2 percent were convicted for violation of the Bankruptcy Act, while convictions for this offense among wholesale dealers constituted 39 percent. Of the total prison population, 38.6 percent were convicted for counterfeiting, the corresponding percentages of convictions for pressmen and printers, waiters, and chauffeurs, truck and tractor drivers were 84.6 percent, 69.4 percent, and 54.9 percent, respectively; the corresponding percentages for bankers and bank officials, and wholesale dealers were 0 percent and 8.7 percent, respectively. That the occupation of an inmate determines in some measure the nature of his crime is quite evident from table 14.

TABLE 14.—*Percentage distribution of commitments according to crimes in certain occupational classes*

Occupational classes	Number	Percent															
		Bank act	Bankruptcy	Counterfeiting	Dyer act	Forgery	Immigration	Impersonation	Interstate commerce	Mail theft	Mann act	Narcotics	Post office theft	Postal laws	Prohibition	Robbery	All others
All occupations	1,000	3.9	2.0	38.6	6.0	2.4	3.0	2.1	1.6	2.6	2.3	9.2	1.3	8.4	9.6	1.0	5.8
General and not specified labor	74			51.3	2.7	2.7	6.8			2.7	1.4	8.1	2.7	4.0	12.2	2.7	2.7
Bankers and bank officials	21	90.6					4.7										4.7
Wholesale dealers (import and export)	23	4.4	39.0	8.7					4.4			4.4	4.4	17.3	8.7		8.7
Owners, managers, truck, transfer, and cab companies	13			15.4	15.4	15.4			15.4			23.0	7.7		7.7		
Barbers, hairdressers, manicurists	33			42.5	9.1	3.0						24.2			18.2		3.0
Servants	42			38.0		7.1	2.4	2.4		4.8	4.8	11.9		9.5	4.8	2.4	11.9
Pressmen and plateprinters	13			84.6	7.7										7.7		
Brokers, commercial, not specified	10			30.0		10.0								40.0			20.0
Waiters	23			64.4		4.4	4.4					13.0		4.4	4.4		
Bakers	18			50.0	5.6		5.6		5.6	5.6		16.4		5.6	5.6		
Mechanics	45			42.3	9.0		4.4	4.4	4.4		2.2	4.4	2.2	2.2	15.7	4.4	4.4
Civil engineers and surveyors	12			41.8	25.0			8.3				8.3		8.3			8.3
Chauffeurs, truck and tractor drivers	62			54.9	8.0		1.6			1.6	1.6	14.6		3.3	8.0	1.6	4.8
Tailors	21			52.5			14.4	4.7		4.7	14.3		4.7			4.7	
Professional, all other occupations	23			39.0	17.3		4.4					4.4		13.0	4.4		17.5
Domestic and personal, all other occupations	26			35.0	3.8	3.8	3.8					26.9		3.8	7.7	3.8	11.4
Bookkeepers and cashiers	19	57.9		15.7		10.5								5.3	5.3		5.3
Salesmen	70			37.1	7.2	5.7	2.9	2.9		1.4	5.7	11.5		15.7	5.7		4.3
Other industries (labor)	14			50.1	7.1				7.1		14.3	7.1					14.3
Domestic and personal service	150			42.0	2.7	5.3	2.7	1.4	.7	3.4	1.4	16.0	.7	6.7	8.8		8.2
Agricultural	24			16.7	20.4		4.2				8.4		4.2	8.4	33.5		4.2
Manufacturing and mechanical industries	344	.6	.9	48.0	5.2	.9	4.6	2.0	2.6	3.5	3.2	8.4	1.4	3.0	9.6	2.0	4.1
Extraction of minerals	11			27.1				9.2						36.2	18.3		9.2

The analysis of occupations of 1,000 inmates of Northeastern Penitentiary indicates a differential incarceration rate for different occupations. Broadly speaking, these rates are significant, although it must be remembered that the occupational classification of inmates was based on the statement of the inmate and subject to some falsification. This falsifying tendency is probably responsible for the excessive number of engineers, and the markedly deficient number of laborers and operatives (table 12). It cannot be invoked, however, to account for the marked excess of general and nonspecified labor, nor for the excessive number of domestics; the existing bias would have tended to lower the number of persons reporting these pursuits so that these excesses are all the more significant. It seems that persons showing a higher quota among Federal inmates are those without a definite occupational pursuit, those with occupations which are under the surveillance of the Federal Government, those with occupations requiring great mobility and frequent contact with strangers, and those in domestic and personal service. There is also some indication that persons in urban communities, pursuing occupations subject to seasonal fluctuation, and running business establishments which may serve as a decoy of vice, contribute more than their share. There is a higher incarceration rate for occupations requiring no skill and little exertion. On the other hand, occupations contributing less than their quota are officials and supervisors in industry, highly skilled industrial workers, the more strenuous occupations with little opportunity for contact with strangers, and especially farmers.

While the age distributions of inmates for the various occupational pursuits show wide differences, they reflect, with few exceptions, the typical deviations already indicated. The interrelation between certain occupations and specific offenses is striking, providing us with some evidence of the importance of environment in crime.[5]

SUMMARY

1. The age distribution of inmates of State and Federal penal and correctional institutions shows no significant variation in different years (table 1).

2. The age distribution of inmates differs from that of nondelinquent population by higher proportion of younger men, by a smaller interquartile range, and greater asymmetry about the median; these characteristics are most pronounced among State commitments (table 1).

3. There is a wide variation in commitment rates at different ages (table 2).

4. Commitment rates for native- and foreign-born whites and for Negroes show a significantly higher rate for the Negro and a signifi-

[5] Since the publication of the recent pamphlet of the United States Bureau of the Census on Prisoners in Penal and Correctional Institutions, for the years 1931 and 1932, the new material has been analysed in the same way as that for the years 1926, 1927, 1929, and 1930, and the results are essentially the same.

cantly lower rate for foreign-born in State and Federal commitments. At Northeastern Penitentiary and in New York State the commitment rates for foreign- and native-born whites are approximately the same (tables 3 and 4).

5. The variation of age distribution of inmates in different States is relatively slight, showing only a small interrelation between the age of delinquent and nondelinquent population. The commitment rates for the 1,000 inmates increase progressively with the size of community from which the inmates are derived. The interrelation between size of community and crime rate is less perfect in New York State commitments.

6. The low median, the small interquartile range, and the marked asymmetry characteristic of the age distribution of inmates are still more pronounced among recidivists (tables 5, 6, 7, 8, and 9). The greater deficiency of older offenders among recidivists is an indication that younger offenders more often become repeaters.

7. The characteristics of a low median age, a small interquartile range, and asymmetry are most pronounced in crimes that are more violent and direct (tables 10 and 11).

8. The incidence of crime varies widely in different occupations. The age distribution of inmates, while varying considerably for different occupational groups, is not altered significantly when the occupational differences are eliminated by standardization. There is definite relation between certain occupations and specific crimes.

CONCLUSION

At the beginning of this paper it was suggested that age may have an etiological significance in crime. We have seen that the age of criminals shows with considerable consistency certain characteristics pointed out in the first section. Throughout the subsequent sections these characteristics have been shown to reappear irrespective of race, nativity, residence, occupation, or type of crime for which convicted. In fact it has been shown definitely that these characteristics are most pronounced in more violent and direct crimes and in general less so in crimes of a technical nature. It has also been shown that these same characteristics are more pronounced among recidivists than among first offenders.

In the opinion of the writer, physiological immaturity, legal exemption of minors, and social leniency toward younger offenders account largely for the lower commitment rates of persons in their early teens. But these factors cannot account for the sharp increase of commitments after the early teens, or the rapid decrease of commitment rates after age 30. The hypothesis which seems to account best for the type of disparity found in the commitment rates at different ages, and the distributional characteristics resulting, is that emotional instability

is largely responsible for the greater commitment rate of youthful offenders, and as individuals mature they tend to become emotionally more stable. If this assumption is correct, patient experimental study of temperamental traits of delinquents and nondelinquents may enable the quantitative determination of emotional maturity and stability in different individuals, increasing our knowledge of the etiology of crime and adding to our ability in selecting good risks for parole and other forms of conditional release.

THE INFLUENCE OF TRYPAN BLUE UPON THE RESISTANCE OF MICE TO TRANSPLANTABLE AND INDUCED TUMORS

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It is known that vital staining with certain dyes lowers the resistance of mice to the growth of transplantable tumors. Ludford (1, 2, 3) has shown that subcutaneous injection of the acid dyes trypan blue and vital new red, as well as intravenous injection of inorganic colloids, produces this result. In his experiments, vital staining lowered all three types of resistance; namely, natural resistance, resistance induced by the subcutaneous injection of embryonic tissues, and, finally, concomitant immunity, or resistance induced by growth of a transplantable tumor within the tissues of the animal. Similar results were obtained in this laboratory (4), following vital staining with trypan blue. It has been found that subcutaneous injection of trypan blue inhibits the production of concomitant immunity and also destroys an acquired resistance to mouse sarcoma 180.

The first part of this paper deals with the results of experiments in which efforts were made to determine whether vital staining with trypan blue lowered the resistance of pure-strain mice to such an extent that they could grow, in serial passage, a tumor arising spontaneously within a member of another pure strain. As a rule, a spontaneous tumor arising within a member of a pure strain of mice will grow in all members of the same strain, but not in members of other pure strains. This has been the experience in this laboratory. Cloudman (5, 6, 7), however, has found tumors arising within strain A mice which grew in a high percentage of strain D animals and also in members of several other inbred lines. One of these tumors (7) also grew progressively in a few individuals of an alien mammalian species. Other exceptions to the genetic theory of transplantation are recorded by Bittner (8) in his recent review of genetic studies concerning inoculable tumors. Apparently no attempts have been made to determine whether these "exceptional" tumors could undergo serial transmisson through alien inbred lines of mice.

The second part of the present paper deals with the results attending two experiments in which attempts were made to ascertain whether vital staining with trypan blue lowered the resistance of mice to the carcinogenic activity of 1:2:5:6-dibenzanthracene. Burrows, Hieger, and Kennaway (9) have shown that a solution of dibenzanthracene in lard, when injected subcutaneously, induces sarcomas in mice. This finding has been confirmed in this laboratory (10, 11) by using both pure-strain mice and the ordinary stock or "market" mice.

Since previous investigations with trypan blue had been performed with transplantable tumors only, observations were made to determine whether the dye also lowered the resistance of mice to the growth of "induced" tumors produced by dibenzanthracene.

EXPERIMENTAL ANIMALS

All pure-strain mice were purchased from the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine. Mice of strain A, strain D, and strain C_3H were used. These strains are described as follows:

Strain D: Inbred since 1909. Dilute brown in color.
Strain A: Inbred since 1918. Albino in color.
Strain C_3H: Inbred since 1921. Color of wild house mice.

All three strains have a high incidence of spontaneous tumors in breeding females. The pure-strain animals were used only for transplantation experiments.

Only albino mice purchased from a local dealer, and therefore not pure strain, were used in experiments for testing the effect of vital staining upon their reaction to the carcinogenic activity of dibenzanthracene. These animals are referred to as stock mice throughout this paper. All mice were less than 1 year of age and weighed about 20 grams.

TECHNIQUE

All trypan blue injections were made subcutaneously in the back with a sterile 0.5 percent solution of trypan blue (Grübler) in distilled water. The amounts injected are stated in the protocols of the individual experiments.

A solution of 1:2:5:6-dibenzanthracene in lard was prepared by filtering the lard at 38° C. and adding dibenzanthracene in the proportion of 4 mg to each cubic centimeter of lard. The lard was then heated to 140° C., at which temperature the compound dissolved completely. The solution was kept in the cold until used, when it was heated to about 40° C. All injections of the lard-dibenzanthracene solution were made subcutaneously in the right axillary region.

The customary trocar technique was used for all tumor inoculations. All implants were made subcutaneously in the right groin.

EXPERIMENTAL OBSERVATIONS

THE INFLUENCE OF TRYPAN BLUE UPON THE RESISTANCE OF PURE-STRAIN MICE TO A TUMOR ARISING WITHIN ANOTHER STRAIN

Trypan blue lowered the natural resistance of pure-strain mice. It was found that tumors arising within strain A and strain C_3H mice grew progressively and underwent serial passage in vitally stained strain D animals. The results of three experiments dealing with this phase of the investigation are presented in charts 1, 2, and 3. The charts show the results obtained with both the experimental strain D mice and necessary control mice of the same or other strains. Each perpendicular line represents an attempt at tumor passage. These lines are broken to show the time of inoculation and the size (in millimeters) of the tumor used for inoculation. The number and strain of both the experimental and control mice used for each passage are shown beneath the horizontal lines. The results in each group of mice are placed just below the information showing the strain and number of animals used. When growth occurred, a note is made of the time of death and, if of interest, the size (in millimeters) of the tumor in the last mouse dying as the result of tumor growth. Only those animals showing progressive tumor growth are marked as "+" in the charts. Mice that remained completely negative or had small nodules which receded are marked "—" in the charts.

It is seen that tumor passage was carried on through strain D mice only. These animals were given trypan blue injections as follows:

0.5 cc 6 days prior to inoculation;
0.5 cc 4 days prior to inoculation;
0.5 cc 2 days prior to inoculation;
0.5 cc at weekly intervals for 2 months after inoculation.

In experiment 1 (chart 1), an adenocarcinoma of the mammary gland arising spontaneously within a strain C_3H mouse was first passed to four normal C_3H animals on April 17, 1934. As usual, all these mice grew the tumor. One of these tumors was used to inoculate four normal strain D mice, four normal C_3H mice, and seven strain D mice that had received injections of trypan blue. The tumor grew progressively in six of the vitally stained strain D mice, in none of the normal strain D mice, and in all the strain C_3H animals. On June 21, 1934, a tumor (18 by 10 mm) from a vitally stained mouse was used for passage to other normal strain D and strain C_3H mice, as well as vitally stained strain D animals.

It is seen that the C_3H tumor underwent four passages in vitally stained strain D mice. After three passages through stained strain D animals, the tumor retained its ability to grow in all animals of strain C_3H. After the first passage through stained strain D mice, it grew in one of four normal strain D mice. This tumor failed to

grow when passed to other normal strain D animals on August 14, 1934. The tumor also grew in another normal strain D mouse after the third passage through stained mice. It grew progressively and killed the animal on November 13, 1934.

In experiment 2 a carcinoma of the mammary gland arising spontaneously within a strain A mouse was passed to vitally stained strain D mice without previous passage through strain A animals. As shown in chart 2, the tumor grew successfully through two passages of stained D mice. The vitally stained mice of the attempted third passage died before the tumor became established, and so a strain A control of the same passage served as the source of tumor material for the next passage. The tumor grew through two more passages of stained strain D mice. It retained its ability to grow in strain A mice throughout the course of the experiment. Two tumors developed in normal strain D mice, but transplants from these failed to grow in other normal strain D animals.

In experiment 3 a spindle-cell sarcoma induced by subcutaneous injection of dibenzanthracene in a strain C_3H mouse had undergone eight passages through strain C_3H mice. Because this tumor possesses remarkable growth energy in strain C_3H mice, it was hoped that passage through vitally stained strain D mice might enhance its growth energy so that it could grow, in serial passage, through normal strain D mice. As shown in chart 3, the tumor grew through three generations of vitally stained strain D animals. While it grew progressively in four normal strain D mice, three of these tumors failed to establish themselves when implanted into other normal strain D mice.

The results of these three experiments in which three different tumors were used show that vital staining of strain D mice lowers their resistance so as to permit serial passage of tumors arising within the other strains of mice. There is also some evidence that the alien tumor growing in stained strain D mice became adapted to strain D animals, since, in some instances, transplants from a tumor in a stained mouse grew in normal D strain mice. However, all attempts at further passage of these tumors through normal strain D mice were unsuccessful.

THE INFLUENCE OF TRYPAN BLUE UPON THE RESISTANCE OF MICE TO THE CARCINOGENIC ACTION OF 1·2·5·6-DIBENZANTHRACENE

As stated previously, it was desirable to know whether vital staining with trypan blue lowered the resistance of mice to the development of "induced" tumors as well as to the growth of transplantable tumors. The results of two experiments dealing with this phase of the investigation are presented in this report.

Experiment 4.—Seventy female stock mice were used in this investigation. Each of these animals received two injections of 0.25 cc of the dibenzanthracene-lard solution—the first on May 7, 1934, and the second on May 15, 1934. Thirty of these mice were then kept as normal controls. Each of the remaining 40 received injections of trypan blue as follows: 0.3 cc on May 2, May 4, May 11, and May 18, followed by 9 injections of 0.5 cc at approximately weekly intervals until August 8, 1934. Thus, each mouse received 13 injections totaling 5.7 cc of the trypan blue solution. The first tumors appeared on August 15, 1934, just 100 days after the initial injection of the dibenzanthracene-lard solution. At that time 36 of the vitally stained mice and 29 of the normal mice were living. The animals were examined each week up to December 5, 1934, when the experiment was discontinued. At that time two of the trypan blue mice and eight of the normal mice were alive and tumor free. The results of the experiment are summarized in table 1.

It is seen that, at the end of the 19th week, 16 of the stained mice and only 2 of the normal mice had developed tumors. The experiment indicates that injections of trypan blue lowered the resistance of the mice so that they developed sarcoma earlier than did the normal animals.

TABLE 1.—*Experiment 4: Appearance of dibenzanthracene tumors in vitally stained and normal mice*

Time, in weeks, after dibenzanthracene-lard injection that tumors appeared			14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
	Number of mice injected, May 7, 1934	Number living Aug 15, 1934	Number of tumors																	Total number of tumors	Per cent tumors as of Aug 15, 1934	Number dying of other causes	Number living Dec. 5, 1934
Trypan blue	40	36	2	3	5	1	3	2	2	1	3	2	3	-	1	2	1	--	1	32	89	6	2
Normal	30	29	1	-	--	--	1	--	3	1	3	--	3	--	3	2	1	--	2	20	68	2	8

Experiment 5.—In this experiment an effort was made to confirm and extend the results of experiment 4. Ninety-eight female stock mice were used in the experiment. Each mouse received two injections of 0.25 cc of the dibenzanthracene-lard solution—the first on November 22, 1934, and the second on November 26, 1934. The mice were divided into three groups—two groups for vital staining and one group for controls. The first group (group A) received small amounts (0.1 cc) of trypan blue. Since relatively large injections of the dye lowered the resistance of mice in experiment 4, it was thought that perhaps the smaller injections might increase their resistance. The second group (group B) represented an attempted repetition of

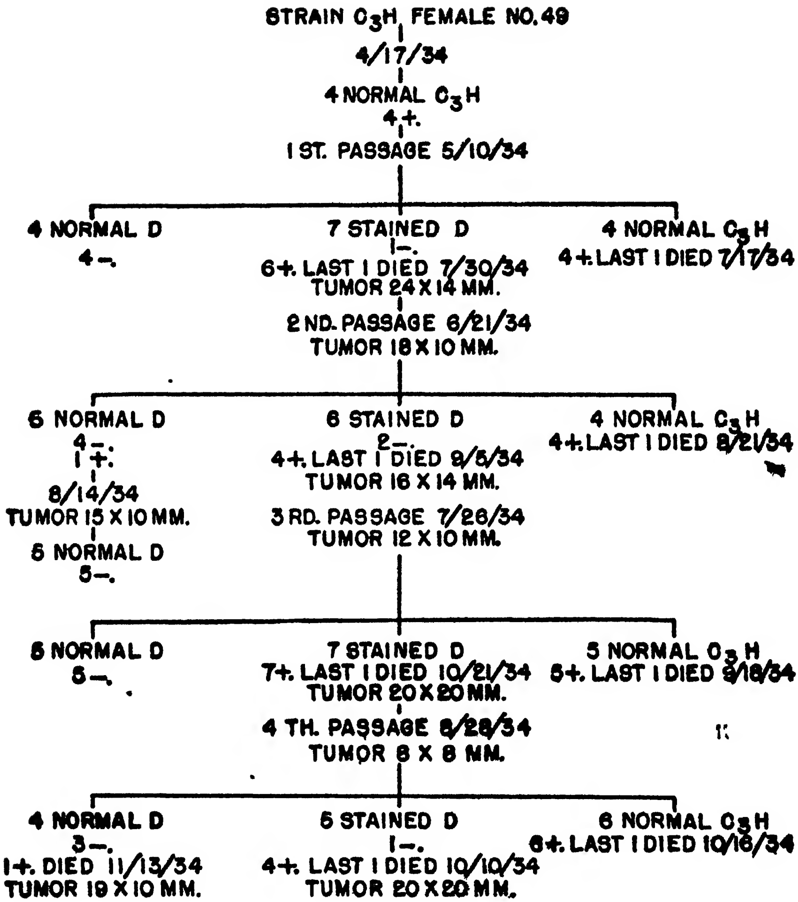

CHART 1.

Experiment 1.—Showing serial passage of a strain C_3H adenocarcinoma through vitally stained strain D mice.

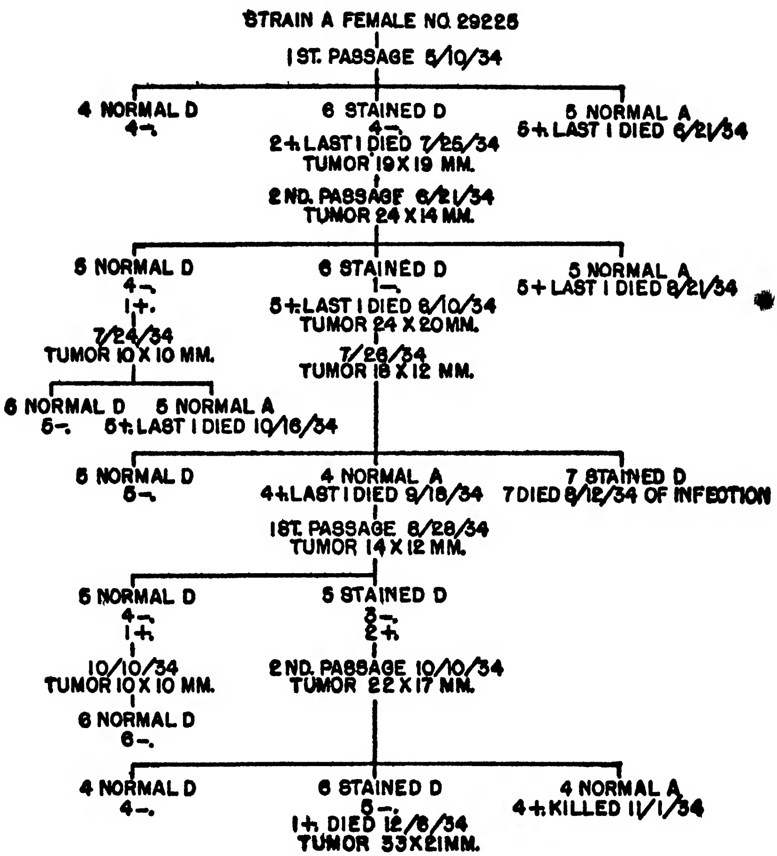

CHART 2

Experiment 2.—Showing serial passage of a strain A carcinoma through vitally stained strain D mice.

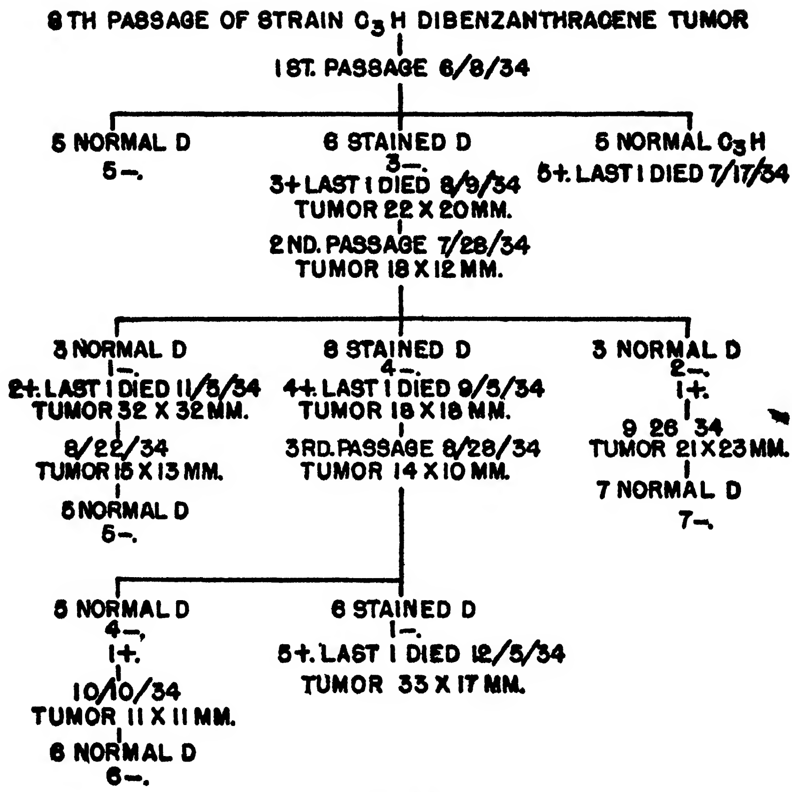

CHART 3

Experiment 3.—Showing serial passage of a strain C_3H sarcoma through vitally stained strain D mice.

vitally stained mice of experiment 4, in that they received larger amounts of the dye. The third group (group C) served as controls to group B by receiving subcutaneous injections of sterile distilled water in amounts equal to the trypan blue injections of group B. The time and amount of injections are summarized briefly as follows:

Group A.—Each received 0.1 cc of trypan blue solution on November 16 and November 27 and then a series of 0.1-cc injections at approximately weekly intervals until January 26, 1934. Each animal received a total of 0.8 cc of the trypan blue solution.

Group B.—Each received 0.3 cc of trypan blue on November 16, November 19, and November 27 and then a series of 0.5-cc injections at approximately weekly intervals until January 26, 1934. Thus, each of these mice received a total of 3.9 cc of the trypan blue solution. The injections were stopped because of the poor condition of the mice in this group. It will be noted that these mice received 1.8 cc less of the trypan blue solution than did the stained mice of experiment 4.

Group C.—These animals received injections of distilled water at the same time and in amounts equal to the trypan blue injections to group B mice. Mice treated in this way were considered to be better controls than the uninjected normals of experiment 4.

TABLE 2.—*Experiment 5: Appearance of dibenzanthracene tumors in vitally stained and control mice*

Time, in weeks, after dibenzanthracene lard injection that tumors appeared			17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34				
Group	Number injected Nov 22, 1934	Number living Mar 26, 1935	Number of tumors																		Total number of tumors	Percent tumors as of Mar 26, 1935	Number dying of other causes	Number living Aug 1, 1935
A	36	29	1	1	2	2		3	2	2	2			1		2		1		2	21	72	6	2
B	32	17		1	1	4	1		1	5		1	1	1		1					17	100	0	0
C	30	27			1		1		1	7	2	3	2	1				2			20	74	1	6

The first tumor appeared on March 26, 1935, 124 days after the first injection of the dibenzanthracene-lard solution. At this time, 29 of the group A mice, 17 of group B mice, and 27 of group C mice were alive, and all were in good condition. The results of the experiment are shown in table 2.

It is seen that the findings in experiment 4 were confirmed. Of the first 22 tumors to appear, only 3 were in the control animals. However, seven tumors appeared in the controls during the twenty-fourth week of the experiment. If this week is included, it is found that of the first 36 tumors, 10 were in the control mice. By comparing the results in group B and group C it is seen that, at the end of the

twenty-fourth week, 13, or 82 percent, of the vitally stained mice and 10, or 47 percent, of the controls had developed tumors. There is evidence also that the smaller amounts of trypan blue given to mice of group A lowered rather than increased their resistance.

CONCLUSION

Vital staining by subcutaneous injection of trypan blue lowers the resistance of mice to such an extent that—

(1) Tumors arising within mice of strain A or strain C_3H grew progressively and underwent serial passage through vitally stained strain D mice;

(2) Tumors induced by subcutaneous injection of dibenzanthracene appeared earlier in vitally stained stock mice than in control animals.

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DEATHS DURING WEEK ENDED APRIL 18, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr. 18, 1936	Corresponding week, 1935
Data from 86 large cities of the United States.		
Total deaths	9,422	8,845
Deaths per 1,000 population, annual basis	13.2	12.3
Deaths under 1 year of age	556	611
Deaths under 1 year of age per 1,000 estimated live births	50	56
Deaths per 1,000 population, annual basis, first 16 weeks of year	13.6	12.6
Data from industrial insurance companies:		
Policies in force	68,409,589	67,781,169
Number of death claims	13,836	12,189
Death claims per 1,000 policies in force, annual rate	10.6	9.4
Death claims per 1,000 policies, first 16 weeks of year, annual rate	10.9	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Apr. 25, 1936, and Apr. 27, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 25, 1936, and Apr. 27, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr 25, 1936	Week ended Apr 27, 1935	Week ended Apr 25, 1936	Week ended Apr 27, 1935	Week ended Apr 25, 1936	Week ended Apr 27, 1935	Week ended Apr 25, 1936	Week ended Apr 27, 1935
New England States								
Maine			69	1	72	223	1	0
New Hampshire		1			44	3	0	0
Vermont					496	47	0	0
Massachusetts	6	5			1,400	495	4	3
Rhode Island					72	415	1	2
Connecticut	1	2	4	8	109	1,263	1	0
Middle Atlantic States								
New York	49	23	[1] 15	[1] 5	3,454	2,927	22	26
New Jersey	15	17	19	17	360	2,140	15	3
Pennsylvania	34	67			1,014	5,634	9	5
East North Central States								
Ohio	17	56	36	91	200	2,652	11	27
Indiana	5	8	76	21	21	403	3	4
Illinois	35	66	66	69	30	2,628	22	19
Michigan	1	11	6	2	102	5,698	3	4
Wisconsin	1	2	40	36	81	1,736	5	2
West North Central States								
Minnesota		6			382	676	0	0
Iowa	7	9	7	4	1	275	1	3
Missouri	17	31	465	56	32	668	4	11
North Dakota		5	7	16	0	40	0	0
South Dakota					5	45	0	1
Nebraska	10	4			13	370	1	1
Kansas	11	7	47	12	16	1,209	1	1
South Atlantic States								
Delaware				3	17	11	0	0
Maryland [2]	6	3	11	9	330	85	18	9
District of Columbia	13	9	2	1	121	56	4	4
Virginia	12	16	235		112	584	11	5
West Virginia	9	11	90	54	76	393	13	1
North Carolina	20	13	28	8	44	192	2	2
South Carolina	3	2	264	129	44	24	2	0
Georgia [3]	9	3	170				3	0
Florida	6	4	31	2	18	74	5	0
East South Central States:								
Kentucky	9	10	278	4	310	468	62	10
Tennessee	12	11	396	59	90	23	7	6
Alabama [3]	18	15	353	58	5	541	3	6
Mississippi [3]	5	8					1	6

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 25, 1936, and Apr. 27, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935
West South Central States:								
Arkansas	10	2	352	13	-------	42	2	0
Louisiana	8	23	99	7	49	58	0	0
Oklahoma [4]	8	10	490	60	22	115	5	2
Texas [3]	43	31	481	97	246	214	9	0
Mountain States:								
Montana [5]	3	2	21	23	17	426	2	2
Idaho [5]	1	-------	-------	-------	63	11	0	1
Wyoming [5]	-------	1	1	-------	3	79	1	0
Colorado	4	7	-------	-------	38	536	0	0
New Mexico	2	4	6	1	42	32	1	0
Arizona	2	2	119	14	134	34	2	1
Utah [2]	1	-------	-------	-------	16	2	0	0
Pacific States:								
Washington	-------	8	2	-------	327	550	0	4
Oregon [5]	3	5	59	28	225	310	0	1
California	26	29	74	42	2,841	1,606	10	8
Total	442	544	4,398	950	13,103	36,013	267	174
First 17 weeks of year	9,759	11,520	126,688	97,129	154,697	456,754	4,076	2,312

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935
New England States:								
Maine	0	1	9	11	0	0	0	2
New Hampshire	0	0	7	13	0	0	2	0
Vermont	0	0	7	14	0	0	1	0
Massachusetts	0	1	252	246	0	0	0	2
Rhode Island	0	0	33	13	0	0	0	0
Connecticut	0	0	57	76	0	0	3	0
Middle Atlantic States:								
New York	0	1	834	1,063	0	0	9	3
New Jersey	0	2	354	210	0	0	3	5
Pennsylvania	2	1	539	781	0	0	21	9
East North Central States:								
Ohio	1	0	281	823	0	0	10	5
Indiana	0	0	219	125	0	3	0	1
Illinois	0	1	823	1,343	3	0	4	8
Michigan	0	2	252	331	1	0	3	1
Wisconsin	0	0	507	381	5	24	1	1
West North Central States:								
Minnesota	0	0	307	424	5	2	0	0
Iowa	0	0	254	116	40	1	0	2
Missouri	0	2	253	60	15	2	1	7
North Dakota	0	0	45	84	12	0	1	2
South Dakota	0	0	49	19	28	1	0	0
Nebraska	0	0	122	83	22	35	0	1
Kansas	0	2	468	81	23	9	0	2
South Atlantic States:								
Delaware	0	0	3	10	0	0	0	0
Maryland [2]	0	0	76	111	0	0	0	6
District of Columbia	0	0	18	64	0	0	0	1
Virginia	0	0	68	39	0	0	5	0
West Virginia	1	0	41	59	0	0	3	4
North Carolina	1	3	28	20	0	1	1	0
South Carolina	0	0	2	2	0	0	1	0
Georgia [3]	0	0	10	1	0	1	3	7
Florida	0	0	5	3	0	0	2	1
East South Central States:								
Kentucky	0	0	47	39	0	0	4	14
Tennessee	0	0	27	24	0	1	2	2
Alabama [3]	1	2	5	5	0	0	4	5
Mississippi [3]	0	0	2	3	0	0	0	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 25, 1936, and Apr. 27, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935	Week ended Apr. 25, 1936	Week ended Apr 27, 1935	Week ended Apr 25, 1936	Week ended Apr. 27, 1935	Week ended Apr. 25, 1936	Week ended Apr. 27, 1935
West South Central States:								
Arkansas	1	0	8		1	0	1	0
Louisiana	0	1	5	11	1	2	1	15
Oklahoma [4]	0	0	52	13	0	0	4	2
Texas [3]	0	0	39	38	0	0	4	30
Mountain States:								
Montana [5]	0	0	99	6	7	19	0	1
Idaho [5]	0	0	48	4	1	0	0	0
Wyoming [5]	0	0	34	11	6	4	0	0
Colorado	0	0	102	176	0	2	0	0
New Mexico	0	0	59	24	0	3	3	0
Arizona	0	1	28	67	0	0	0	4
Utah [2]	0	0	66	153	2	0	0	0
Pacific States:								
Washington	0	0	90	49	10	32	2	2
Oregon [5]	0	0	37	43	53	4	4	0
California	3	3	311	151	0	4	14	5
Total	10	23	6,982	7,423	235	150	117	153
First 17 weeks of year	305	409	131,239	122,471	3,898	3,218	1,884	2,256

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Apr 25, 1936, 11 cases, as follows: Georgia, 5, Alabama, 4, Texas, 2.
[4] Exclusive of Oklahoma City and Tulsa
[5] Rocky Mountain spotted fever, week ended Apr. 25, 1936, 9 cases, as follows Montana, 4; Idaho, 1; Wyoming, 2; Oregon, 2

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March 1936										
Alabama	11	43	8,330	116	126	19	2	56	3	4
Arizona	2	18	1,822	2	447	1	1	133	1	4
Georgia	43	48	3,981	59	26	14	0	85	2	5
Hawaii Territory	3	4	190	[1] 2	23		0	1	0	5
Idaho	4	4	74		244		0	362	16	
Illinois	76	149	202	13	212	2	5	4,095	64	26
Kansas	8	61	425		45	1	2	1,366	229	2
Louisiana	6	60	1,018	86	323	1	1	65	10	23
Mississippi	10	24	29,286	2,589	773	103	1	43	1	3
Missouri	34	101	4,819	30	134	1	2	981	50	5
Nevada			38		38		0	68	0	0
New York	123	144		4	11,493		4	5,351	0	45
North Dakota	4	3	18		12		1	259	9	0
Oklahoma [2]	39	49	1,186	45	32	13	0	111	12	10
Oregon	5	8	733	2	1,177	2		166	8	7
Rhode Island	7	1	4		294		0	142	0	
South Dakota	1	8	18		15		0	270	119	
Texas	45	181	3,161	1,538	2,085	41	5	313	16	11
Vermont		2			2,844		0	86	0	0
Virginia	71	58	6,115	5	649	7	1	232	0	12
Washington	12	6	285		1,349		3	490	46	6
Wisconsin	4	7	267		411		3	2,442	41	3

[1] 2 cases of malaria imported by ship.
[2] Exclusive of Oklahoma City and Tulsa.

March 1936

	Cases
Actinomycosis:	
Illinois	1
Anthrax:	
Louisiana	1
New York	1
Texas	3
Chicken pox:	
Alabama	208
Arizona	129
Georgia	120
Hawaii Territory	42
Idaho	32
Illinois	2,193
Kansas	690
Louisiana	122
Mississippi	526
Missouri	313
Nevada	9
New York	2,697
North Dakota	36
Oklahoma [1]	87
Oregon	234
Rhode Island	76
South Dakota	87
Texas	495
Vermont	100
Virginia	219
Washington	465
Wisconsin	1,638
Conjunctivitis:	
Georgia	2
Washington	4
Dengue:	
Georgia	16
Mississippi	8
Texas	1
Dysentery:	
Arizona	20
Georgia (amoebic)	6
Illinois (amoebic)	7
Illinois (amoebic carriers)	32
Illinois (bacillary)	5
Louisiana (amoebic)	2
Mississippi (amoebic)	46
Mississippi (bacillary)	234
Missouri	4
New York (amoebic)	4
New York (bacillary)	11
Oklahoma [1]	3
Texas (bacillary)	3
Virginia (amoebic)	2
Virginia (diarrhea included)	33
Washington (amoebic)	1
Epidemic encephalitis:	
Alabama	2
Georgia	1
Illinois	6
Kansas	1
Louisiana	1
New York	21
Texas	1
Virginia	4
Washington	3
Wisconsin	1
German measles:	
Alabama	6
Arizona	119
Illinois	58
Kansas	22
New York	1,245
Rhode Island	321
Vermont	169
Washington	393
Wisconsin	150
Hookworm disease:	
Georgia	1,044
Louisiana	11
Mississippi	231

March 1936—Continued

	Cases
Impetigo contagiosa:	
Kansas	1
Oklahoma [1]	2
Oregon	53
Washington	1
Lead poisoning:	
Illinois	2
Leprosy:	
Hawaii Territory	5
Louisiana	1
Mumps:	
Alabama	347
Arizona	269
Georgia	325
Hawaii Territory	11
Idaho	205
Illinois	1,602
Kansas [2]	497
Louisiana	33
Mississippi	1,766
Missouri	1,289
Nevada	14
North Dakota	158
Oklahoma [1]	64
Oregon	107
Rhode Island	115
South Dakota	90
Texas	2,132
Vermont	200
Virginia	309
Washington	361
Wisconsin	4,661
Ophthalmia neonatorum:	
Alabama	3
Illinois	7
Missouri	1
New York [2]	13
South Dakota	1
Paratyphoid fever:	
New York	3
Oregon	1
Texas	2
Viriginia	1
Puerperal septicemia:	
Mississippi	30
Washington	1
Rabies in animals:	
Alabama	89
Illinois	30
Louisiania	28
Mississippi	13
Missouri	3
New York	7
Oregon	4
Washington	10
Rabies in man:	
Illinois	1
Oklahoma [1]	2
Rocky Mountain spotted fever:	
Nevada	1
Oregon	1
Scabies:	
Arizona	1
Kansas	1
Oklahoma [1]	6
Oregon	55
Septic sore throat:	
Georgia	82
Idaho	21
Illinois	12
Kansas	7
Louisiana	17
Missouri	72
New York	69
Oklahoma [1]	18
Oregon	3
Rhode Island	6
South Dakota	2
Vermont	1
Washington	7
Wisconsin	12

March 1936—Continued

	Cases
Tetanus:	
Alabama	4
Kansas	2
Louisiana	7
Missouri	1
New York	3
Oklahoma [1]	1
Virginia	1
Trachoma:	
Arizona	35
Illinois	121
Louisiana	1
Mississippi	6
Missouri	32
North Dakota	2
Oklahoma [1]	2
South Dakota	4
Washington	27
Trichinosis:	
New York	13
South Dakota	2
Tularemia:	
Georgia	4
Illinois	3
Louisiana	4
Missouri	1
New York	2
Virginia	1
Typhus fever:	
Alabama	7
Georgia	17
Hawaii Territory	6
New York	1
Rhode Island	1
Texas	14
Undulant fever:	
Arizona	1
Georgia	6
Illinois	7
Kansas	3
Louisiana	1
Mississippi	5
New York	13
North Dakota	1
Oklahoma [1]	1
Rhode Island	1
Texas	4
Vermont	1
Washington	6
Wisconsin	6
Vincent's infection:	
Illinois	27
Kansas	33
New York [2]	92
North Dakota	7
Oklahoma [1]	1
Oregon	12
Whooping cough:	
Alabama	53
Arizona	93
Georgia	54
Hawaii Territory	25
Idaho	2
Illinois	1,417
Kansas	120
Louisiana	229
Mississippi	445
Missouri	91
New York	1,127
North Dakota	11
Oklahoma [1]	28
Oregon	36
Rhode Island	16
South Dakota	17
Texas	153
Vermont	85
Virginia	180
Washington	128
Wisconsin	634

[1] Exclusive of Oklahoma City and Tulsa.

[2] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Apr. 18, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	1	2	5	0	0	0	6	22
New Hampshire:											
Concord	0		0	0	0	1	0	0	0	0	9
Manchester	0		0	0	2	5	0	0	0	0	17
Nashua	0			9		0	0		0	0	
Vermont:											
Barre											
Burlington	0		0	83		1	0	0	0	2	9
Rutland	0		0	91	0	0	0	0	0	0	7
Massachusetts:											
Boston	0		0	494	33	74	0	13	0	26	210
Fall River	0		0	4	4	22	0	0	0	0	31
Springfield	0		0	1	2	4	0	0	0	7	43
Worcester	0		0	10	5	11	0	0	0	9	
Rhode Island:											
Pawtucket											
Providence	1		0	26	7	13	0	4	0	1	74
Connecticut:											
Bridgeport	1		0	3	2	5	0	1	0	5	36
Hartford	0		0	0	1	5	0	3	0	0	43
New Haven	0	1	0	0	1	4	0	0	0	53	44
New York:											
Buffalo	1		2	40	15	36	0	11	0	3	167
New York	88	13	6	1,857	144	448	0	94	2	66	1,540
Rochester	0		1	1	6	3	0	0	1	0	67
Syracuse	0		0	55	11	11	0	1	0	6	66
New Jersey:											
Camden	0	1	0	4	4	7	0	2	0	2	39
Newark	0	10	0	5	13	101	0	5	0	13	109
Trenton	0		0	1	2	2	0	0	0	0	41
Pennsylvania:											
Philadelphia	9	7	2	587	54	88	0	25	1	73	579
Pittsburgh	3	6	3	14	28	92	0	7	1	12	179
Reading	0		0	3	3	2	0	0	0	1	30
Scranton	1			0		2	0		0	0	
Ohio:											
Cincinnati	2		4	19	13	18	0	5	0	1	127
Cleveland	3	40	6	61	30	61	0	8	0	61	243
Columbus	1	2	2	2	11	9	0	6	0	3	90
Toledo	0	2	2	48	10	8	0	8	1	21	77
Indiana:											
Anderson	0		0	0	2	12	0	1	0	9	11
Fort Wayne	0		1	0	4	10	0	0	0	0	31
Indianapolis	0		0	7	31	83	0	6	0	20	120
South Bend	0		2	0	3	2	0	0	0	3	20
Terre Haute	0		0	1	0	4	0	0	0	6	18
Illinois:											
Alton	0		0	0	3	1	0	0	0	0	19
Chicago	14	16	8	15	72	211	0	48	2	156	810
Elgin	0		0	0	1	5	0	0	0	0	19
Moline	0		0	0	2	4	0	0	0	0	12
Springfield	0		0	0	6	15	0	0	0	1	38
Michigan:											
Detroit	4	6	5	31	45	108	1	8	0	130	321
Flint	0		0	2	8	16	0	1	0	8	35
Grand Rapids	0		0	3	6	10	0	2	0	5	32
Wisconsin:											
Kenosha	0		0	1	0	16	0	0	0	1	4
Madison	0		0	0	2	5	0	2	0	10	40
Milwaukee	0		0	6	5	60	0	1	0	84	106
Racine	1		0	0	0	12	0	0	0	3	25
Superior	0		0	1	0	14	0	0	0	0	8
Minnesota:											
Duluth	0		0	0	2	7	0	2	1	15	17
Minneapolis	0		0	281	3	104	0	3	0	26	115
St. Paul	0		0	149	12	40	0	4	0	2	75

City reports for week ended Apr. 12, 1930—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0	......	......	0	......	4	0	......	0	4	......
Davenport	1	......	......	0	......	19	0	......	0	0	......
Des Moines	1	......	......	0	......	9	0	......	0	0	44
Sioux City	0	......	......	0	......	9	34	......	0	1	......
Waterloo	0	......	......	0	......	9	0	......	0	0	......
Missouri:											
Kansas City	1	......	0	3	21	72	0	4	0	1	125
St. Joseph	2	......	0	0	8	4	0	1	0	0	38
St. Louis	13	......	11	1	23	58	0	8	0	8	276
North Dakota:											
Fargo	0	......	0	0	0	7	0	0	0	0	14
Grand Forks	1	......	......	0	......	0	0	......	0	0	......
Minot	0	......	0	0	0	3	0	0	0	0	5
South Dakota:											
Aberdeen	0	......	......	1	......	1	0	......	0	0	......
Sioux Falls	0	......	0	0	0	3	4	0	0	0	8
Nebraska:											
Omaha	3	......	1	5	9	60	8	1	0	0	55
Kansas:											
Lawrence	0	2	0	0	4	5	0	1	0	0	9
Topeka	......	......	......	......	......	......	......	......	......	......	......
Wichita	0	......	0	1	7	28	0	1	0	2	37
Delaware:											
Wilmington	0	......	0	1	4	0	0	0	0	4	22
Maryland:											
Baltimore	2	11	8	139	33	28	0	20	0	31	296
Cumberland	1	......	0	0	0	0	0	0	0	0	9
Frederick	0	......	0	0	1	0	0	0	0	0	2
District of Col.:											
Washington	13	2	2	96	19	16	0	14	0	12	192
Virginia:											
Lynchburg	1	......	1	1	0	0	0	0	0	19	14
Norfolk	1	......	0	1	3	0	0	0	0	2	31
Richmond	0	......	1	3	2	23	0	1	0	0	53
Roanoke	1	......	0	0	2	0	0	0	0	0	28
West Virginia:											
Charleston	0	3	1	0	1	2	0	2	0	0	26
Huntington	0	......	0	1	0	1	0	0	0	0	......
Wheeling	0	......	0	20	3	0	0	0	0	0	20
North Carolina:											
Gastonia	0	......	0	0	1	0	0	0	0	0	9
Raleigh	0	......	0	0	4	0	0	0	0	2	17
Wilmington	0	......	0	0	2	0	0	0	0	0	11
Winston-Salem	0	1	1	23	1	3	0	1	0	0	11
South Carolina:											
Charleston	0	14	1	0	2	1	0	1	0	2	25
Columbia	......	......	......	......	......	......	......	......	......	......	......
Florence	0	......	0	0	2	0	0	0	0	2	11
Greenville	0	......	0	14	0	0	0	0	0	1	8
Georgia:											
Atlanta	1	16	3	0	7	16	0	7	1	0	91
Brunswick	0	1	1	0	2	0	0	0	0	0	6
Savannah	1	5	1	0	0	0	0	2	0	0	32
Florida:											
Miami	1	17	2	10	1	4	0	1	0	11	31
Tampa	0	1	1	0	0	1	0	2	0	0	26
Kentucky:											
Ashland	3	......	......	1	......	0	0	......	0	0	14
Covington	0	......	0	2	4	3	0	0	0	0	20
Lexington	0	......	0	15	4	0	0	2	0	4	24
Louisville	0	......	3	3	9	21	0	7	0	9	89
Tennessee:											
Knoxville	0	1	0	85	0	0	0	0	0	0	24
Memphis	1	......	0	1	13	8	0	6	0	14	106
Nashville	1	......	2	2	10	4	0	4	0	0	41
Alabama:											
Birmingham	3	14	3	0	9	0	0	3	1	0	75
Mobile	0	5	2	0	3	1	0	1	0	0	26
Montgomery	0	1	......	1	......	1	0	......	0	0	......
Arkansas:											
Fort Smith	0	......	......	0	......	1	0	......	0	0	......
Little Rock	0	80	0	0	8	0	0	1	0	0	9
Louisiana:											
Lake Charles	0	......	1	0	5	1	0	0	0	0	15
New Orleans	7	98	10	18	21	6	0	15	1	45	183
Shreveport	0	0	1	3	17	0	0	2	0	0	72

City reports for week ended Apr. 18, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Oklahoma:											
Oklahoma City	2	20	8	2	16	6	0	2	0	2	64
Texas:											
Dallas	6	14	12	30	15	7	0	2	0	3	96
Fort Worth	3		0	0	8	2	0	1	0	9	48
Galveston	0		0	1	8	0	0	1	0	0	24
Houston	7		4	2	11	1	0	2	0	0	96
San Antonio	4		3	13	9	1	0	7	0	1	69
Montana:											
Billings	1		0	0	1	8	0	0	0	1	14
Great Falls	1		0	0	6	3	0	0	0	1	10
Helena	0			0	0	0	6	0	0	0	4
Missoula	0		0	0	2	2	0	0	0	0	8
Idaho:											
Boise	0		0	10	2	1	0	0	0	0	8
Colorado:											
Colorado Springs	0		0	0	1	6	2	0	0	1	13
Denver	0		1	14	11	13	0	5	0	40	86
Pueblo	0		0	0	3	20	0	0	0	5	9
New Mexico:											
Albuquerque	0		2	1	1	12	0	2	0	0	11
Utah:											
Salt Lake City	0		3	29	0	41	2	3	0	4	39
Nevada:											
Reno											
Washington:											
Seattle	0		0	207	8	19	5	6	0	15	162
Spokane	0	1	1	6	3	26	0	2	0	15	33
Tacoma	0		1	35	3	4	0	0	0	5	31
Oregon:											
Portland	0	4	2	53	4	10	0	5	1	6	102
Salem	0	5		8		1	0		0	0	
California:											
Los Angeles	11	15	1	498	16	48	0	21	1	42	330
Sacramento	0		0	4	1	6	0	1	3	5	39
San Francisco	1		3	383	6	61	0	15	0	18	186

City reports for week ended Apr. 12, 19[illegible]—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	0	2
Worcester	1	0	0
New York:			
Buffalo	4	0	0
New York	15	5	0
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	2	3	0
Pittsburgh	1	1	0
Ohio:			
Cincinnati	7	2	0
Columbus	1	1	0
Toledo	1	0	0
Indiana:			
Indianapolis	2	1	0
Illinois:			
Chicago	5	2	0
Springfield	2	3	0
Michigan:			
Detroit	1	2	0
Wisconsin:			
Milwaukee	1	0	0
Minnesota:			
Minneapolis	1	1	0
Iowa:			
Des Moines	1	0	0
Missouri:			
St. Joseph	0	0	1
St. Louis	3	0	0
Maryland:			
Baltimore	19	7	0
District of Columbia:			
Washington	5	3	0
Virginia:			
Lynchburg	1	0	0
Richmond	4	2	0
West Virginia:			
Wheeling	1	0	0
North Carolina:			
Wilmington	1	1	0
South Carolina:			
Charleston	4	1	0
Georgia:			
Atlanta	0	1	0
Savannah	1	0	0
Kentucky:			
Lexington	1	0	0
Louisville	1	2	0
Tennessee:			
Nashville	2	2	0
Alabama:			
Mobile	1	0	0
Louisiana:			
New Orleans	5	0	0
Shreveport	0	1	0
Oklahoma:			
Oklahoma City	1	0	0
Texas:			
Galveston	1	0	0
Houston	2	0	0
Colorado:			
Colorado Springs	0	1	0
New Mexico:			
Albuquerque	0	1	0
Utah:			
Salt Lake City	1	0	0
Washington:			
Seattle	1	0	0
Oregon:			
Portland	2	0	0
California:			
Los Angeles	3	2	[illegible]

Epidemic encephalitis.—Cases: Denver, 1.

Pellagra.—Cases: Toledo, 1; Washington, D. C., 1; Winston-Salem, 1; Charleston, S. C., 1; Atlanta, 1; Memphis, 1; Birmingham, 2; New Orleans, 1; Dallas, 1.

Typhus fever.—Cases: Savannah, 2.

FOREIGN AND INSULAR

HAITI

Anthrax.—Under date of April 20, 1936, an outbreak of anthrax was reported in the vicinity of Desdunes, Haiti, a small village on the west coast of the island between Gonaives and St. Marc.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for April 24, 1936, pages 522-534. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued May 29, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Ceylon—Weligama.—During the week ended April 11, 1936, 1 case of bubonic plague was reported at Weligama, Ceylon.

Hawaii Territory—Hawaii Island—Hamakua District—Pohakea Sector.—Two rats found April 15, 1936, in Pohakea Sector, Hamakua District, Hawaii Island, Hawaii Territory, have been proved plague-infected.

Indochina—Tanghai.—During the week ended April 11, 1936, 2 fatal cases of plague were reported at Tanghai, Indochina.

Malta—Curmi.—During the week ended April 18, 1936, 3 cases were confirmed as bubonic plague at Curmi, Malta

Smallpox

China—Canton.—During the week ended April 4, 1936, 1 case of smallpox was reported at Canton, China.

Iraq—Basra.—During the week ended April 18, 1936, 2 cases of smallpox were reported at Basra, Iraq.

Mexico.—Smallpox has been reported in Mexico as follows: January, 1936, Chiapas State, 1 case; Guanajuato State, 5 cases, 5 deaths, including 1 case and 5 deaths at Leon; Jalisco State, 109 cases, 28 deaths, including Guadalajara, 85 cases, 24 deaths; Mexico Federal District, 10 cases, 3 deaths, including Mexico City, 9 cases, 3 deaths; Puebla State, 2 cases, 1 death; Tamaulipas State, 8 cases. February 1936, Aguascalientes State, Aguascalientes, 5 cases, 1 death; Coahuila State, Torreon, 1 case; Colima State, 1 case; Jalisco State, Guadalajara, 115 cases, 50 deaths; Lower California, 7 cases; Mexico State, 2 cases, 2 deaths; Mexico Federal District, 22 cases, 4 deaths; Puebla State, 9 cases, including Puebla, 8 cases; Sonora State, 1 case.

Typhus Fever

Mexico.—Typhus fever has been reported in Mexico as follows: January 1936—Guanajuato State, 15 cases, 3 deaths, including Leon, 7 cases, 1 death; Mexico Federal District, 86 cases, 26 deaths, including Mexico City, 75 cases, 22 deaths; Oaxaca State, 1 case; Puebla State, 1 case; Queretaro State, 3 cases; San Luis Potosi State, San Luis Potosi, 8 cases. February 1936—Aguascalientes State, Aguascalientes, 5 cases; Durango State, 1 case; Guanajuato State, Leon, 16 cases, 1 death; Mexico State, 2 cases, 3 deaths; Mexico Federal District, 73 cases, 20 deaths; Oaxaca State, 2 cases, 1 death; Puebla State, Puebla, 2 cases, 1 death; San Luis Potosi State, San Luis Potosi, 6 cases, 1 death.

Yellow Fever

Bolivia—Santa Cruz Department—Terebinto.—During the month of March 1936, 10 cases of yellow fever were reported at Terebinto, Santa Cruz Department, Bolivia.

Brazil.—Yellow fever has been reported in Brazil as follows: Matto Grosso State, Campo Grande, April 7, 1936, 1 case, 1 death; Minas Geraes State, Arary, March 20, 1936, 1 case, 1 death; Parana State, Jacarezinho, March 22, 1936, 1 case, 1 death; Londrina, March 17–21, 1936, 2 cases, 2 deaths; Sao Paulo State, Agudos, March 2, 1936, 2 cases, 2 deaths; Araraquara, March 26, 1 case, 1 death; Assis, March 5, 1 case, 1 death; Avare, March 1, 2 cases, 2 deaths; Batataes, February 29, 1 case, 1 death; Cerequira Cezar, March 2, 1 case, 1 death; Espirito Santo de Turvo, February 28, 1 case, 1 death; Patos, March 24, 1 case, 1 death; Piratininga, March 3, 2 cases, 2 deaths; Rincao, March 3, 1 case, 1 death; Santa Cruz de Rio Pardo, February 25–27, 2 cases, 2 deaths.

Colombia.—Yellow fever has been reported in Colombia as follows: Boyaca Department, January 6–23, 1936, 3 deaths; Intendencia of Meta, Villavicencio, January 25–29, 1936, 2 deaths.

Niger Territory—Fada N'Gourma.—During the week ended April 18, 1936, 1 case of yellow fever was reported at Fada N'Gourma, Niger Territory.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen R C WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 39; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 MAY 15, 1936 NO. 20

RELATIONSHIP OF THE PUBLIC HEALTH SERVICE TO THE PROGRAM FOR THE CONTROL OF SYPHILIS AND GONORRHEA IN GREATER NEW YORK [1]

By R. A. VONDERLEHR, *Assistant Surgeon General, United States Public Health Service*

Recently an advisory committee to the Public Health Service recommended measures which it is hoped will be included in the venereal disease control program of State and local health departments (*1*). This committee report includes recommendations for the administration of the program, for the development of adequate treatment facilities, for the prevention of the prenatal transmission of syphilis, for epidemiological work, for the provision of modern laboratory facilities including diagnostic and inpatient treatment centers, for cooperation of health departments with physicians, for the problem of obtaining more reliable morbidity and mortality reports, and for the improvement of present methods utilized in the informative and educational program. Only general recommendations were included in the report so that they might be adapted to the varying social, economic, and racial conditions in all parts of the United States.

This program, which has been submitted for the consideration of health officers and other workers interested in the venereal disease problem, is believed to include all of the fundamental points in a comprehensive venereal disease control organization. The committee appreciated the fact that few health departments in the United States would be in an economic position to adopt a program embracing all of these principles. Nevertheless, the members thought it worth while to present all of the essential features in the control of syphilis and gonorrhea so that their recommendations might be used as a standard for the development of individual programs.

Any discussion of venereal disease control organization in a given area should be based upon a thorough knowledge of the conditions and factors which influence the program in that area. In considering the needs of Greater New York the writer must admit the lack of thorough knowledge of such conditions and factors. At the same time there is some advantage in viewing at a distance the program of

[1] Read before the Regional Conference on Social Hygiene, New York City, Jan. 15, 1936.

a given area and comparing it with other programs in areas more or less removed.

Greater New York represents a distinctly populous area with a prevalence rate for syphilis which is probably close to the average for the entire country. It is fortunate in having available a large number of sources of treatment either free, part-pay, or pay. Modern transportation makes it possible to travel to almost any part of the area within an hour's time. Under such favorable conditions considerable progress should have been made already in bringing syphilis and gonorrhea under control.

It would be impossible even for anyone thoroughly familiar with local conditions to point out in so short a time all the reasons why success has not been attained. But certain defects seem so obvious that they may well be enumerated here.

ALLOCATION OF FUNDS

In a recent publication (*2*) the health commissioner of the city of New York reported that for the year 1935 the sum of $145,000 had been made available for the venereal disease control program in the five boroughs of the city. He appreciated the need for a larger appropriation, as was evidenced by an expression of hope that more money would be available for work during the next year. He regarded the control of syphilis as the biggest single problem facing the health department. During the year 1935 the commissioner estimated (*3*) that approximately $700,000 would be expended on the control of all communicable diseases, including the venereal diseases. This estimate does not include the isolation and hospitalization of cases. The cost of isolation and hospitalization of communicable diseases amounts to much more than the expenditures for control work only. In addition, administrative policy in hospitals is much more liberal with regard to the care of tuberculosis and the acute communicable diseases than it is for cases of syphilis and gonorrhea.

In estimating the proportion of funds which should be allocated for the control of syphilis and gonorrhea, the morbidity reports from New York City, both for the venereal and for other communicable diseases, must be considered. During the fiscal year ended June 30, 1935, there were 57,182 new cases of syphilis and gonorrhea reported. In the same period, 98,212 cases of other communicable diseases were reported. Syphilis and gonorrhea, therefore, represented approximately 37 percent of all of the communicable diseases reported in that area for that year. On this basis, approximately $250,000 of the total for communicable disease control should be expended on syphilis and gonorrhea.

The allocation of funds is even more disproportionate if surveys of all sources of treatment are taken as the basis for estimating

morbidity. Everyone appreciates the fact that the venereal diseases are poorly reported, while morbidity records are reasonably complete for most of the other communicable diseases. A survey of all sources of treatment conducted by the American Social Hygiene Association in New York City more than a decade ago made it possible to estimate that approximately 40,200 new cases of early syphilis and 77,800 new cases of acute gonorrhea seek authorized medical care in this area each year. Compare this total of 118,000 new cases of syphilis and gonorrhea with the total number of cases of other communicable diseases and note the enormous importance which syphilis and gonorrhea assume. The allocation of funds for the control of the venereal diseases on such a basis would exceed $350,000, excluding the appropriation for isolation and hospitalization of cases.

Syphilis and gonorrhea are of more serious import than most of the other communicable diseases. The latter are, as a rule, self-limited, mortality is comparatively low, and complications do not usually follow. Syphilis and often gonorrhea are chronic in character and frequently result in late crippling manifestations. They are the cause of mortality to an undetermined but probably an enormous extent. These facts emphasize the need for a more equable distribution of public money in the future for venereal disease control work. The Public Health Service particularly desires that more money be allotted to such work when funds become available under the Social Security Act.

EFFICIENCY OF CLINICS

The recent survey of male gonorrhea clinics in New York City, made by the social hygiene committee of the New York Tuberculosis and Health Association, indicates the need for the adoption of minimum efficiency standards in such clinics. According to the report of this survey a number of defects were noted. These included high cost of treatment, crowding of patients, failure to segregate the sexes, lack of privacy when treatment is administered, poor and inefficient medical follow-up of patients, failure to perform physical examinations, failure to instruct patients in the public health importance of medical care, poor clinical records, and inadequate laboratory work, including failure to perform routine serologic tests for syphilis among such patients.

Syphilis clinics in New York City were studied in an earlier survey of the social hygiene committee of the same association. Practically the same defects were noted that have been found more recently in the survey of male gonorrhea clinics. Furthermore, it was shown that the darkfield examination for *Spirochaeta pallida* was properly employed in only 17 percent of the syphilis clinics. Jacoby (*4*) reported that, during the year 1932, only 651 suspected lesions were

examined by the darkfield method at the municipal clinics. The number of such examinations at these clinics had almost doubled in 1935. It still seems probable, however, that hundreds of cases of seronegative primary syphilis are not given the darkfield examination each time the procedure is indicated.

At a previous regional conference Goldberg (*5*) discussed the problem of the distribution of patients among syphilis clinics in New York City. In this discussion he noted that patients traveled from distant parts of the city to attend clinics quite far from home. He expressed the opinion that they did so because the treatment was free at these clinics or that they did not want to attend a clinic near their place of residence or employment because of the desire for secrecy. The latter circumstance may be of importance, although in a city the size of New York it should be easy to lose one's identity even in a nearby community. It is believed that the infected individual in any large city is likely to go to the treatment center which he thinks renders the most efficient service. In England, for example, Harrison (*6*) noted a very considerable increase in the attendance at a given treatment center following improvement in either the personnel or the physical facilities at the clinic. In one case he showed a doubled attendance a few weeks after a change in the location of the clinic and appointment of a new medical officer who was not only skilled in his specialty but was thoroughly imbued with the public health idea.

THE INFORMATIVE AND EDUCATIONAL PROGRAM

In Greater New York there are 83 clinics for the treatment of the venereal diseases, in comparison with 827 clinics throughout the United States, according to figures available to the Public Health Service. This represents a proportion of one clinic to approximately 130,000 people, as compared with one clinic per 150,000 population for the entire country. While this number of clinics is not believed to be sufficient to serve the population adequately, it would seem that it should have been possible long ago to have caused a material reduction in the incidence of syphilis if clinic organization had been efficient and the facts regarding early diagnosis and adequate treatment had been known by all citizens. Failure to bring about this decreased incidence must, to a considerable degree, be attributable to a deficiency in the informative and educational program.

This part of the venereal disease control program has long been recognized as one of the most important phases of the work. It has been impeded, unfortunately, by prudery and an unwillingness to face the facts. In recent years a concerted effort has been made to deal with syphilis and gonorrhea in the same way as with other communicable diseases. In the promotion of the educational pro-

gram among citizens, this fundamental principle should never be forgotten.

The conspiracy of silence which has prevented the use of modern methods of disseminating information pertaining to the venereal diseases will be broken down only by long and persistent effort. This effort is worthy of the untiring support of every worker interested in the problem. The greatest success can be attained, however, by arousing individuals of national repute to an appreciation of the importance of syphilis and gonorrhea and by persuading them to express their opinion publicly.

Collectively, the physicians in Greater New York are as well informed as those in any other area in the United States. This must be true, because the uninformed physician could not survive in an environment with such intense competition. Agencies interested in the public health control of syphilis and gonorrhea should not, however, become too self-confident and permit the informative campaign among physicians to lag. Even the progressive physician under the rigorous demands of private practice may lose sight of the magnitude of his responsibility in this program.

This part of the control plan will not have been completed until every citizen not only appreciates the dangers of the venereal infections, but realizes that if these infections are contracted, adequate early treatment and thorough observation will bring about recovery in the vast majority of cases.

COOPERATION OF PUBLIC HEALTH AGENCIES IN THE METROPOLITAN AREA

The metropolitan area of Greater New York may be said to include numerous cities in New York State, New Jersey, and Connecticut, the suburban areas in several counties of the two former States and one county in Connecticut. Public health agencies operating with varying degrees of efficiency are responsible for the direction of the venereal disease control program in these cities and suburban areas. Present modern transportation makes the individual citizen infected with syphilis and gonorrhea a danger not only to the citizens in the city or suburban area in which he lives, but also to those individuals with whom he comes in contact in the areas to which he daily travels. The interdependence of health agencies upon each other in the control of all communicable diseases is obvious.

For effective venereal disease control work the State and local authorities must cooperate. There must be complete and mutual interchange of information pertaining to the numerous epidemiologic problems related to the control of syphilis and gonorrhea. In addition to the exchange of such information, there is need for a more liberal policy in making treatment available to all citizens, regardless

of residence. These two points, while fundamental, represent only a part of the very cordial relationship which should exist between the health agencies and the clinics in this area. The Social Hygiene Council of Greater New York has accomplished much in coordinating the efforts of the agencies concerned. Its work should be continued and amplified, because the idea of mutual cooperation and coordination of activities is sound. Such activities should be extended to include all State and local organizations which have an interest in the control of syphilis and gonorrhea. The achievement of this ideal should greatly enhance the work of all local health departments in this area. The personnel of the Public Health Service offer their full support to the attainment of this end.

To summarize, the program directed against the venereal diseases in Greater New York should be intensified in the following ways:

1. The provision of funds in the future should be on a basis comparable to the gravity of the situation and in such amount that an efficient control organization may be built up. Morbidity reports and surveys indicate that a sum of at least $500,000 should be provided annually for New York City in order to cope intelligently with the problem.

2. To insure adequate treatment for all citizens, efficient clinics should be subsidized. The treatment centers should be reorganized, if necessary, in order that they may meet accepted standards of efficiency.

3. An energetic promotion of present informative and educational methods should be pursued.

4. A permanent and competent administrative division of venereal disease control should be organized in all local health departments. One of the chief functions of this division should be the coordination of the activities of all agencies interested in the venereal disease problem, and the reciprocal exchange of pertinent information with other health departments in the metropolitan area.

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STUDIES OF SEWAGE PURIFICATION

IV. The Use of Chlorine for the Correction of Sludge Bulking in the Activated Sludge Process

By Russell S. Smith, *Associate Sanitary Engineer*, and W. C. Purdy, *Special Expert, United States Public Health Service*

The efficiency of many activated sludge sewage-treatment plants is materially affected at times by a diffuse or fluffy condition of the sludge particles, which, in the clarification tank following aeration, results in slow settlement and, hence, increased volume or "bulking" of the sludge. Consequently, in aggravated cases large amounts of these sludge solids may be carried over the effluent weirs instead of being removed through the bottom sludge outlets. Because this condition admittedly constitutes one of the "weak links" in this method of sewage treatment, our late consultant, Mr. George W. Fuller, recommended the advisability of the Stream Pollution Investigations Station of the Public Health Service undertaking some studies of the biological and biochemical factors involved in sludge bulking.

Extensive microscopical observations of activated sludges have indicated that there are at least two distinct conditions of the sludge floc, either of which when present will cause the sludge to settle with difficulty, if at all. One is a thin, diffuse or spongy, ragged floc, that tends to float because of its relatively large surface area; the other is a floc possibly of moderate or good quality, but heavily infested with thin fungus threads which extend out in all directions from the main body and thereby increase greatly the buoyancy of the floc and doubtless separate materially the individual particles as well. All gradations and combinations of these two conditions may occur in specific instances. Thus a floc that is quite fine, ragged, and diffuse may be settled in the final clarifier with reasonable success; but if a moderate growth of fungus should appear, the settling process is seriously retarded. The present discussion is confined to the bulking resulting from excessive amounts of fungus in the sludge.

For determination of the physical condition of sludge floc particles, the use of a low-power (preferably binocular) microscope, magnifying about 20 or 30 diameters, is most essential. Daily routine observations of the sludge by such an instrument will disclose any progressive changes in floc structure that signify either the oncoming improvement or deterioration of sludge-settling quality. By adjusting the substage mirror at a point slightly *in front* of the optical axis of the microscope to secure a dark field effect, and using a dilution (1 in 40 is suggested) of the sludge in a cell about 1 millimeter deep of the type used for plankton enumeration (with cover-glass adjusted), the floating flocs can be seen clearly outlined against a dark field and any attached fungus may be readily distinguished by reason of the light reflected

from their minute filaments, affording a sharp contrast with the surrounding dark field. A true picture of the undistorted floating floc, as it occurs in its natural environment in the clarification tank, is thus obtained.

References in the literature to bulking caused by fungus, including descriptions and characteristics of the causative organism, have been quite frequent. Many means have been suggested to inhibit the growth of the fungus, such as the addition of lime, increased aeration, decreased aeration, chlorine, elimination of carbohydrates from the sewage to be treated, and others. One of the difficulties experienced in the use of chemicals for this purpose has been that, when applied in a concentration sufficient to destroy the fungus growth, the normal fauna and flora essential for the functioning of activated sludge were killed and the effluent deteriorated rapidly.

Chlorine has been used in connection with the activated sludge process by many investigators. Dallyn and De Laporte (*1*), in 1926, reported chlorinating return sludge to give a residual of 0.05 p. p. m. without upsetting plant operation. Apparently in this case the chlorine was used for odor control. In 1929, Bell (*4*) added bleaching powder to the return sludge at Barnsley, England, at an average rate of 22 p. p. m. available chlorine, and stated that it "has been found very useful in restricting the amount of septic matter returned to the aeration tank." Gascoigne (*5*) in 1931 reported the use in Canada of bleaching powder applied to return activated sludge to correct disturbances in the process. Heukelekian (*6*) in 1931 reported increased turbidity in the supernatant liquor due to sterilization of activated sludge with chlorine.

Chlorination of sewage entering activated sludge plants has been tried by many investigators with widely varying results. Goudey (*7*) in 1932 reported that, at Pasadena, prechlorination tended to cause bulking.

The Committee on Sewage Disposal of the American Public Health Association (*10*) reported in 1933 that, "although chlorine has been tried by several investigators in an effort to control bulking of activated sludge, there are as many negative as positive results. Hence, its value for this purpose remains unproven."

EXPERIMENTAL STUDY

Two methods of approach to the problem of fungus growth control seemed feasible. These were (1) isolation of the organism in pure culture and determination of its growth requirements and possible elimination of essential foods or environmental conditions, and (2) addition of some material in a concentration toxic to the fungus but not to the other microscopic organisms normal to proper functioning activated sludge.

The first of these procedures has thus far not been successful. The fungus has been grown in pure culture, but our efforts to reinoculate it into sewage have failed. Attention was therefore directed to the second method of control. Fungus-laden, aerated sludge was treated, first in 1-liter glass graduates and later in 8-liter bottles in which aeration was provided, with one of a number of toxic materials in varying amounts, and these mixtures were examined under the microscope after definite intervals of time to observe the effect of the chemicals on the fungus strands, as well as upon the other forms of plankton. Phenol, lime, copper sulphate, iron salts, alum, sulphur, silica gel, activated carbon, sodium sulphite, and chlorine were among the chemicals employed. The most consistently favorable results were obtained with chlorine, which, if added in proper proportion, appeared to shrivel the protruding strands of fungus but did not destroy the normal plankton associated with the sludge floc.

Based on these observations, tests were continued on a larger scale in the experimental activated sludge treatment plant when bulking of sludge was experienced. This unit had been operated for several days previous to August 28, 1934, on the fill and draw method. The sludge was in such condition that, after 90 minutes settling, the sludge blanket was only 3 inches below the surface and fungus growths in the floc particles were very abundant. On that date chlorine to the amount of 22.5 p. p. m. was added to the sludge-sewage mixture in the aeration tank and after an interval of 1½ hours' standing, observations indicated that the fungus was adversely affected but that other plankton, except stalked ciliates, remained active. After reseeding with sewage-sludge liquor from another unit to the extent of 4 percent of the tank volume, operation was resumed. The sludge index, $\frac{\text{suspended solids in p. p. m.}}{\text{settleable solids in cc per liter}}$, increased from 2.1 to 10.4 by this treatment and continued to improve, reaching 16.3 by September 10, 1934.

Following these favorable results the suggestion was made to Mr. E. E. Smith, in charge of the Lima (Ohio) activated sludge plant, that the application of chlorine might be of value in retarding the growth of fungus in the activated sludge and thereby improve the bulking condition being experienced. Favorable results were obtained as recorded by Mr. Smith (*12*), and chlorination has since constituted an integral part of the treatment at that plant. Mr. Smith, however, made one noted change in the treatment in that he introduced the chlorine into the return sludge and in smaller amounts than had been attempted before.

During the past year chlorine has been frequently used to reduce fungus growths in activated sludge at this station, using Mr. Smith's method of applying small amounts to the return sludge. Results,

insofar as fungus control is concerned, were uniformly successful. An improvement in the settling of the floc was always obtained if fungus was present, but if the bulking of the sludge was due in any great degree to the presence of a light, diffuse floc, the improvement was not always sufficient to insure satisfactory operation of the plant. Observations pertinent to these experiments are given in table 1, which lists the conditions at the start, the average amount of chlorine used, and its effect as shown by the sludge condition at the end of the experiment.

TABLE 1.—*Experiments showing the effect of chlorine in control of sludge bulking resulting from fungus laden sludge floc*

Experiment no.	Date	Average amount of chlorine used		Sludge index	Sludge blanket, percent of settling tank water depth	Effluent, suspended solids, p. p. m.	Amount of fungus present	Floc condition
		P p m., return sludge	Percent of return sludge dry solids					
1	Dec. 3, 1934	3.46		4.3	100	149	Moderate	Amoeboid, ragged.
	Dec. 9, 1934	0		5.3	89	128	Small	Ragged.
	Dec. 17, 1934			8.8	99	170	do	Do.
2	Dec. 17, 1934	1.52		8.8	99	170	Small	Ragged.
	Jan. 7, 1935	0		10.1	14	18	0	Granular, amoeboid.
	Jan. 29, 1935			5.6	95	172	Trace	Ragged.
3	Mar. 27, 1935	1.37	0.04	1.8	100	312	Moderately abundant.	Spongy, ragged.
	May 14, 1935			2.4	39	10	Small	Do.
4	June 6, 1935	2.12	.04	1.8	79	108	Moderately abundant.	Ragged.
	June 17, 1935			2.6	17	26	Small	Spongy, ragged.
5	June 24, 1935	1.68	.03	4.9	([1])	12	0 to trace	Amoeboid.
	July 17, 1935			5.1	([1])	8	Trace	Spongy, ragged.
6	Sept. 21, 1935	.467	.007	3.8	90	26	Large	Large, ragged, dense.
	Oct. 15, 1935	0	0	10.0	26	12	Moderate	Do.
	Oct. 25, 1935			5.0	84	57	Large	Do.
7	Oct. 26, 1935	.620	.008	5.4	78	29	Large	Large, ragged, dense.
	Nov. 5, 1935			13.9	13	8	Moderate	Large, amoeboid.

[1] Less than 13.

These results plainly show that chlorine applied in small amounts to the return sludge reduced fungus growths and so effected an improvement in the sludge. Except in experiment 5 there was a noticeable improvement in the settling of the sludge in the final clarifier, the sludge blanket level dropped, the effluent improved, and the sludge index rose. Experiments 1, 2, and 6 indicate clearly how plant operation improved with the use of chlorine and how, with cessation of chlorination, after an interval, bulking again recurred with attendant operating difficulties. Experiments 1 to 5, inclusive, also

show clearly that although chlorine reduced the interference with proper settling caused by fungus filaments, this treatment did not cause the floc particles to coagulate and did not aid in controlling the bulking that is due to small, light floc particles of comparatively low specific gravity.

Experiments 6 and 7 were made with intermittent, instead of continuous, chlorination of the return sludge. The chlorine dosages were much lighter than those in the other experiments, but were apparently effective in destroying the fungus filaments. These two experiments show the remarkable improvement in sludge settling due to the action of chlorine on fungus filaments attached to large, dense flocs. Experiment 6 also shows the rapid decrease in settling rate of the sludge due to increased fungus growth when chlorination was suspended.

Tables 2 and 3 give daily results for experiments 4 and 6, respectively. It is interesting to note that in experiment 4, when the chlorine dosage was about 2.5 p. p. m., or 0.05 percent on a dry solids basis, the sludge settling improved, but when the dosage dropped to 1.7 p. p. m. or less (about 0 03 percent of the dry solids) the settling deteriorated. In experiment 6, however, chlorine in the amount of 0.7 p. p. m., or 0.01 percent of the dry solids, was ample to effect a marked improvement in the settling. The difference may be due to the marked dissimilarity in the two flocs.

TABLE 2.—*Detailed observations of chlorine treatment of bulking sludge*

EXPERIMENT NO 4

Date	Chlorine used		Sludge index	Sludge blanket, percent of settling-tank water depth	Effluent, suspended solids, p p m	Amount of fungus present
	P p m, return sludge	Percent of return sludge dry solids				
1935						
June 6	2 02	0 04	1 8	79	108	Moderately abundant
June 7	2 73	06	1 6	67	34	Do
June 8	2 73	05	1 9	53	10	Do
June 9	2 59	05	2.5	44	10	
June 10	2 74	05	2 1	40	4	Moderately abundant
June 11	2 57	04	2 8	40	5	Do
June 12	1 60	03	2 4	82	18	Small
June 13	1 70	03	2 6	91	120	Do
June 14	1 60	03	2 5	92	92	Moderate
June 15	1 80	03	3 3	60	28	Do
June 16	1 79	03	3 0	13	28	
June 17	1 60	03	2 6	17	20	Small

NOTE —After June 15, not enough sewage to supply plant Trouble in street sewer

In November 1935 an opportunity was provided to test the use of chlorine for reduction of fungus growths in routine plant operation. The city of Lancaster, Pa., had experienced much trouble with bulking activated sludge at its South Plant and requested aid from the United States Public Health Service in solving the problem.

After investigation of plant arrangement and conditions, the trial use of chlorine was recommended. The floc was large, very diffuse, and apparently loosely bound together with fungus filaments which were present in large amount. Although it was realized that chlorine

Table 3.—*Detailed observations of chlorine treatment of bulking sludge*

EXPERIMENT NO. 6

Date	Chlorine used		Sludge index	Sludge blanket, percent of settling tank water depth	Effluent, suspended solids, p p m	Amount of fungus present
	P p m, return sludge	Percent of return sludge dry solids				
1935						
Sept 21	0 419	0 0078	3.8	90	28	
Sept 22	419	0078	--------	94	26	
Sept 23	419	0077	4 3	74	31	
Sept 24	419	0076	4 2	73	17	
Sept 25	419	0070	4 6	73	17	
Sept 26	429	0083	4 5	70	15	
Sept 27	429	0067	--	63	29	
Sept 28	402	0060	6 0	48	15	
Sept 29	402	0060	--	52	15	
Sept 30	402	0067	6 0	47	11	
Oct 1	402	0068	4 7	50	17	Noticeable decrease.
Oct 2	402	0062	6 1	54	13	
Oct 3	402	0054	6 1	57	19	Large.
Oct 4	402	0057	6 3	51	12	
Oct 5	402	0042	6 6	58	18	
Oct 6	402	0042	---	42	18	
Oct 7	402	0055	7 0	68	21	Moderate
Oct 8	402	0057	6 1	85	46	Do
Oct 9	618	0095	4 4	90	49	Do
Oct 10	690	0112	5 4	50	15	Do
Oct 11	690	0106	5 7	57	16	Do
Oct 12	690	0098	6 4	48	17	Abundant
Oct 13	690	0098	---	34	17	
Oct 14	690	0123	8 6	26	11	
Oct 15	690	0099	10 0	15	12	Moderate
Oct 16	0	0	10 4	15	13	Moderately abundant.
Oct 17	0	0	10 2	50	15	
Oct 18	0	0	11 6	25	12	Small
Oct 19	0	0	10 6	34	13	Moderately abundant.
Oct 20	0	0	---	38	13	
Oct 21	0	0	8 7	35	11	
Oct 22	0	0	9 4	25	11	Moderately abundant.
Oct 23	0	0	8 5	31	13	Do
Oct 24	0	0	----	59	16	Large
Oct 25	0	0	5 0	85	57	Do

would not overcome the diffuseness of the floc, it was felt that reduction in the amount of fungus would cause some improvement in the settling of the sludge. The return sludge was chlorinated for 4 days (Nov. 22 to Nov. 26) at the rate of 4.57 p. p. m., or 0.11 percent of the dry solids. When chlorination was stopped, the amount of fungus had been greatly reduced and the stalked ciliates, chiefly *epistylis*, were beginning to show the effect of the chlorine. During the chlorination of the sludge an unexpected and interesting increase of turbidity of the effluent occurred. The chlorine apparently destroyed some of the fungus strands that had previously loosely held the floc material together. The average size of the floc decreased and considerable very fine floc material, much of it nearly colloidal, appeared in the effluent. Before chlorination was stopped, much of this loosened material had washed out of the floc and the effluent was beginning to clear. After chlorination had been stopped, the turbidity continued to decrease.

Since November 26, chlorine has been used regularly, but in smaller amounts, to prevent excessive growths of fungus. At the end of the year, December 31, 1935, the treatment was continuing successful, the sludge was settling reasonably well, and the final effluent contained about 10 p. p. m. suspended solids.

CONCLUSIONS

Frequent, periodic examination of the sludge floc in a cell under a low-power microscope is essential to obtain proper information concerning the condition of the sludge floc in its natural condition.

Bulking of activated sludge may be caused by diffuse floc structure, fungus growth, or a combination of both.

Chlorination of the return sludge at low rates is a useful method for combating bulking due primarily to fungus growth. Results indicate that the proper rate of chlorination lies between either 0.7 and 7.0 p. p. m. of return sludge, or 0.01 percent and 0.1 percent of the weight of dry solids, depending upon the character of the sludge floc.

Chlorination is not successful against that type of bulking due to light, diffuse floc.

Chlorination of an activated sludge is attended by the serious danger of overchlorinating and destroying the desirable plankton growths. The margin of safety is small and use of the method requires constant careful supervision.

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ACUTE RESPONSE OF GUINEA PIGS TO VAPORS OF SOME NEW COMMERCIAL ORGANIC COMPOUNDS

X. HEXANONE (METHYL BUTYL KETONE)[1]

By H. H. Schrenk,[2] W. P. Yant,[3] and F. A. Patty [4]

This report on the acute response of guinea pigs to hexanone (methyl butyl ketone) vapor in air, is the tenth of a series of similar reports [5] which deal with studies pertinent to establishing a criterion of the toxicity of some chemical products that have recently reached or promise to reach important domestic or industrial use.

The investigation was undertaken at the request of Stanco, Inc., and was conducted jointly by the United States Bureau of Mines and that company. The experiments were conducted by the Bureau of Mines at its Pittsburgh Experiment Station.

SCOPE OF WORK

The scope of the work included a study of the toxicity and physiological response of guinea pigs exposed to vapors of hexanone (methyl butyl ketone). Only acute effects as produced by a single exposure were studied. The experiments were planned to cover a range of concentrations and periods of exposure which produce no response or but slight response, moderate response, and serious response.

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[1] Contribution from the Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa., published by permission of the Director, U. S. Bureau of Mines. Work on manuscript completed May 18, 1935.

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[4] Associate chemist, health laboratory section, Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa.

[5] Acute response of guinea pigs to vapors of some new commercial organic compounds:

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V. Vinyl chloride. Patty, F. A., Yant, W. P., and Waite, C. P. Pub. Health Rep., vol. 45, no. 34, Aug. 22, 1930, pp. 1963-1971. (Reprint No. 1405.)

VI. Dioxan. Yant, W. P., Schrenk, H. H., Waite, C. P., and Patty, F. A. Pub. Health Rep., vol. 45, no. 35, Aug. 29, 1930, pp. 2023-2032. (Reprint No. 1407.)

VII. Dichloroethyl ether. Schrenk, H. H., Patty, F. A., and Yant, W. P. Pub. Health Rep., vol. 48, no. 46, Nov. 17, 1933, pp. 1389-1398. (Reprint No. 1602.)

VIII. Butanone. Patty, F. A., Schrenk, H. H., and Yant, W. P. Pub. Health Rep., vol. 50, no. 36, Sept. 6, 1935, pp. 1217-1228. (Reprint No. 1702.)

IX. Pentanone. Yant, W. P., Patty, F. A., and Schrenk, H. H. Pub. Health Rep., vol. 51, no. 14. (Reprint No. 1739.)

CHEMICAL AND PHYSICAL PROPERTIES

The hexanone used in this study was a commercial grade of methyl butyl ketone sold for industrial use. It was water clear and had an odor resembling acetone, though somewhat more pungent. A determination of the specific gravity and boiling range of this material gave the following results:

Specific gravity

15.6°/15.6° C	0.8167
20°/15.6° C	.8132

Boiling range

Distillate, cumulative (percent)	Temperature ° C., corrected to 700 mm	Distillate, cumulative (percent)	Temperature ° C., corrected to 760 mm
Initial boiling point	120.1	60	127.3
1	122.6	70	127.4
3	123.6	80	127.7
5	125.1	90	128.2
10	126.1	95	128.8
15	126.3	98	129.4
20	126.5	99	130.0
30	126.7	99.5	133.2
40	126.9	99.7	137.2
50	127.0		

Recovery, 99.7 percent; residue, 0.2 percent; lost, 0.1 percent.

These values agree closely with the specifications furnished by the manufacturer for this commercial product. The manufacturer also specified the product to be 86.8 percent ketone as determined by acetylation.

The boiling point of hexanone as given in the International Critical Tables [6] is 127.2° C.

SUGGESTED USES OF HEXANONE [7]

Hexanone is an organic solvent. It is reported to be a good solvent for nitrocellulose and Vinilite products, and has possibilities of use in making lacquers and also varnish and lacquer removers.

TEST APPARATUS

The apparatus for preparing hexanone-air mixtures and for exposing animals was the same as that described in a previous report dealing with butanone.[8]

[6] International Critical Tables, first edition, 1926, vol. 1, p. 202.

[7] These suggestions are given for the purpose of acquainting persons interested in industrial hygiene with the probable fields of use of this product. The Bureau of Mines has done no work on the use of this product and these suggested uses are not intended to be complete.

[8] See footnote 5.

COMPUTATION AND ANALYSIS OF VAPOR-AIR MIXTURES

The method of computation and analysis is the same as that described in the report on butanone.[8] Table 1 gives the results of analyses of a standard aqueous solution of hexanone made to check the accuracy of the method of analysis.

TABLE 1.—*Results of the analysis of portions of a standard aqueous solution of hexanone*

Hexanone taken	Hexanone found by analysis	Recovery
Milligrams	*Milligrams*	*Percent*
16.35	16.59	101.5
24.33	23.51	97.3
32.55	31.40	96.5
40.65	39.30	97.0

Excepting the smallest sample (16 mg) in table 1, an average recovery of 97 percent was obtained. The values obtained for the amount of hexanone in the vapor-air mixtures used in animal exposures (table 2) were corrected by multiplying the determined value by 100/97, or 103.

Table 2 gives the values for the concentrations as computed from the volume of air and amount of hexanone vaporized, and the concentrations found by chemical analysis of vapor-air mixtures used in animal experiments. The calculation of the percent by volume was made on the basis that one gram molecular weight of hexanone is equivalent to 22.4 liters of vapor at 0° C. and 760 mm mercury pressure.

TABLE 2.—*Results of analysis of atmospheres used for exposing animals* [1]

Concentration by—		Concentration by—	
Computation	Analysis	Computation	Analysis
(2)	1.8	0.23	0.21
(2)	1.9	0.22	.24
(2)	2.0	0.21	.24
(2)	2.0	0.22	.23
(2)	[3] 1.9	0.21	.22
(2)	[3] 2.2	0.10	.08
0.67	.67	0.10	.12
0.66	.65	0.10	.11
0.63	.58	0.09	.10
0.65	.66		

[1] Concentrations in percent by volume at 25° C. and 760 mm pressure. To convert to mg per liter, multiply by 40.9.
[2] Concentration obtained by recirculating air in a closed chamber at 30° C and 740 mm pressure across wicks wet with hexanone; no computed concentration.
[3] Obtained by adsorption on air-equilibrated charcoal.

The maximum concentration attainable by recirculating air at 30° C. and 740 mm pressure over large-surface wicks wet with hexanone averaged approximately 2 percent. The remainder of the

[8] See footnote 5.

results in table 2 represent experimental atmospheres prepared by continuously volatilizing a measured amount of hexanone in a measured volume of air.

With the exception of experiments with approximately 2.0 percent concentrations in which the air was recirculated in order to create a maximum vapor concentration the number of air changes in the experimental chamber was always 2 to 3 per hour. Tests have shown that this rate of change in the apparatus used is ample to prevent oxygen deficiency or significant increase in carbon dioxide. The general order of concentrations used in the experiments were 2.0, 0.65, 0.23, and 0.10 percent by volume.

TEST PROCEDURE; DESCRIPTION AND CARE OF ANIMALS

The test procedure and description and care of animals were the same as described in the report on butanone.[9]

RESULTS OF TESTS

This report presents summarized results pertinent to signs or objective symptoms, fatality, and gross pathology.

OBJECTIVE SYMPTOMS

Control animals.—No signs or symptoms were exhibited by the 18 control guinea pigs taken at random from the stock animals used in these tests. No deaths occurred.

Exposed animals.—The signs or symptoms exhibited by animals exposed to hexanone vapor in the order of their occurrence were as follows: Irritation of the nose and eyes manifested by rubbing nose with the forepaws and squinting; lacrimation; incoordination; narcosis; gasping-type respiration; and death. Table 3 gives the average time necessary to produce these symptoms by various concentrations of hexanone vapor in air. The figures given indicate the average time for occurrence of the sign or symptom, excepting those in parentheses, which indicate that the particular symptom did not occur in the maximum period of exposure as given.

TABLE 3.—*Signs and symptoms produced in guinea pigs exposed to vapors of hexanone*

Type of symptom	Concentration of vapor in percent by volume			
	2 0	0 65	0 23	0 1
	Duration of exposure (minutes)			
Nasal irritation (rubbing nose)	(1)	(1)	1	1
Eye irritation (squinting)	(1)	(1)	1	30
Lacrimation	(1)	1	10	30
Incoordination	5–10	20–30	90	2 (810)
Narcosis (unconsciousness)	20–30	90–120	2 (810)	2 (810)
Respiratory changes, dyspnea, gasping	30–60	240–540	2 (810)	2 (810)
Death	70	540	2 (810)	2 (810)

1 Occurred almost immediately after start of exposure.
2 Not observed in the maximum exposure time given in parentheses

9 See footnote 5.

No abnormal signs were observed during or following an exposure to 0.1 percent hexanone vapor in air by volume for 810 minutes. With exposure to 0.23 percent in air, signs of irritation of the nose and eyes occurred in one minute, lacrimation in 10 minutes, incoordination in 90 minutes, but no narcosis nor respiratory changes were observed and no deaths occurred during or following an exposure of 810 minutes. The time for the occurrence of these symptoms decreased rapidly with increases in concentration, and death was produced by an exposure to 0.65 and 2.0 percent vapor in air for 540 and 70 minutes, respectively.

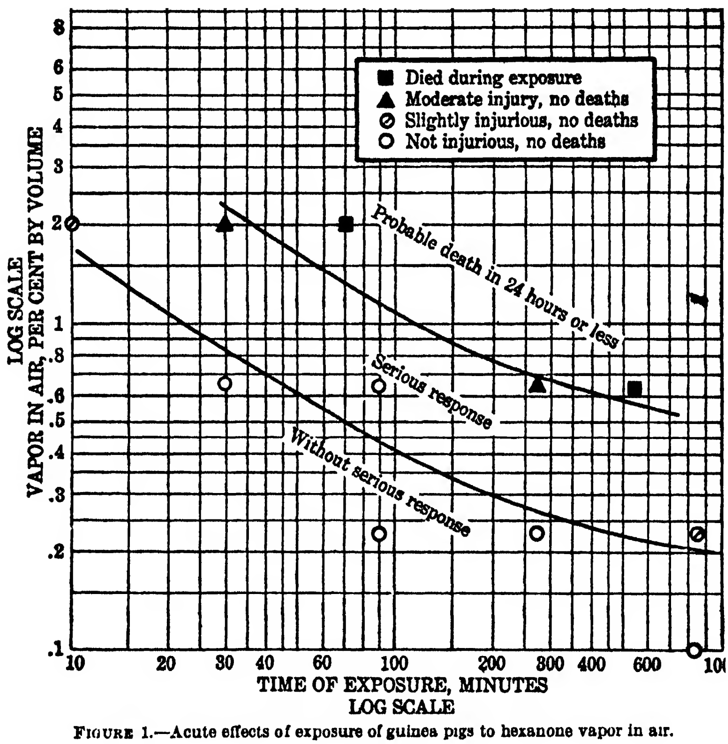

FIGURE 1.—Acute effects of exposure of guinea pigs to hexanone vapor in air.

GROSS PATHOLOGY

Control animals.—The 18 control animals killed for autopsy exhibited no significant gross pathology.

Exposed animals.—The gross pathological findings in animals that died during exposure (see table 3 and fig. 1) were slight congestion of the brain and moderate to marked congestion of the systemic organs. The lungs were moderately congested and emphysematous. Exposure to conditions that caused marked incoordination, narcosis, and a gasping-type respiration (2 percent for 30 minutes, 0.65 percent

for 270 minutes) produced a slight congestion of the brain, with moderate congestion of the lungs, liver, and kidneys in animals killed immediately after exposure; but these findings were absent in animals killed for autopsy 4 to 8 days following exposure. No gross pathology was observed in animals exposed to 0.23 percent for 90 and 270 minutes or to 0.1 percent for 810 minutes.

SUMMARY OF FATALITY AND PHYSIOLOGICAL RESPONSE

The fatality and summary of the response of guinea pigs exposed to hexanone vapor in air is shown graphically in figure 1 and given in conventional degrees of response in table 4. The results of each experiment are designated by a symbol which represents one of four different degrees of severity. The symbols represent the most severe response for a majority, or at least three of a group of six animals exposed to a given condition. The response of none of the animals deviated markedly from that which is representative of the group.

The four degrees of response are given in the legend on figure 1. In addition to representing the response of each group by symbols, the symbols have been separated into three general fields or zones of probable response.

Table 4 gives the concentrations (obtained by direct experiment or extrapolated from table 3 and fig. 1) which produce the degrees of response generally reported in the literature dealing with noxious gases. These data may be compared with toxicological data for other compounds.[10 11 12 13 14 15]

TABLE 4.—*Acute effects of exposure of guinea pigs to hexanone vapor in air*

Acute effects of exposure after various periods of time	Concentration, percent by volume in air
Kills in a few minutes	([1])
Dangerous to life in 30 to 60 minutes	1.0–2.0
Dangerous to life after several hours	0.4–0.6
Maximum amount for 60 minutes without serious disturbance	[2] 0.3
Maximum amount for several hours without serious disturbance	0.15
Maximum amount for several hours with but slight or no symptoms	[3] 0.1

[1] Not produced by 2 percent, the highest concentration obtained in a closed chamber by extended recirculation of air (30° C., 740 mm pressure) over wicks wet with hexanone.

[2] This concentration was found to be very irritating to human beings even for short exposures.

[3] This concentration was found by human beings to have a strong odor and moderate eye and nasal irritation, although no definite reaction was noted in guinea pigs even after 810 minutes' exposure.

[10] See footnote 5.

[11] Sayers, R. R., Yant, W. P., Thomas, B. G. H., and Berger, L. B.: Physiological response attending exposure to methyl bromide, methyl chloride, ethyl bromide, and ethyl chloride. Pub. Health Bull. 185 (1929).

[12] International Critical Tables, first edition (1927), vol. 2, 318; also see errata sheet, vol. 2.

[13] Henderson, Y., and Haggard, H. W.: Noxious gases. Am. Chem. Soc. Monograph No. 35, Chemical Catalog Co., New York. (1927)

[14] Flury, F., and Zernik, F.: Schädliche Gase. Berlin. Published by Julius Springer. (1931.)

[15] Fieldner, A. C., Katz, S. H., and Kinney, S. P.: Gas masks for gases met in fighting fires. U. S. Bureau of Mines Technical paper 248. (1921.)

CAUSE OF DEATH

Death apparently was due to a state of narcosis which terminated in death, rather than to the irritation of the lungs. No animals died following exposure. They either died during exposure or survived the exposure and the 4- or 8-day post-exposure observation period. In some instances the animals were unconscious several hours after termination of exposure (to 2 percent for 30 minutes and 0.65 percent vapor for 270 minutes), but appeared normal 24 hours after exposure.

COMPARISON OF ACUTE TOXICITY OF BUTANONE, PENTANONE, AND HEXANONE

The acute toxicity of hexanone as indicated by exposure of guinea pigs is approximately twice that of pentanone and five times that of butanone.[16] Owing to its lower volatility, however, the maximum concentration obtained with hexanone was only about half that obtained with pentanone and one-fifth that obtained with butanone. This increase in toxicity with increase in molecular weight in the series is another interesting illustration of the relationship between chemical constitution and physiological action. From a practical viewpoint the lower volatility would, under similar conditions of usage, tend to compensate for the higher toxicity.

WARNING PROPERTIES AND HAZARDS OF ACUTE POISONING

Men exposed to 0.23, 0.65, and 2.0 percent vapor in air pronounced the atmosphere extremely disagreeable even for a short time (one-fourth to 1 minute) because of strong odor and irritation to eyes and nasal passages. One-tenth of 1 percent was found to have a strong odor and moderate eye and nasal irritation. Concentrations producing no marked symptoms and apparently harmless to guinea pigs after one exposure of several hours have distinct warning properties of both odor and irritation that are very disagreeable to human beings.

WARNING PROPERTIES AND EXPLOSION HAZARDS

The explosive hazard of hexanone is minimized by the distinct warning properties of concentrations below the inflammable range but cannot be ignored. A few determinations of the inflammable properties of the vapor of the hexanone used in this study indicated the limits to be approximately 1.2 (lower) to 8.0 percent (upper) by volume.

SUMMARY AND CONCLUSIONS

The acute physiological response of guinea pigs to air containing hexanone (methyl butyl ketone) vapor was determined. The concentrations of the vapor ranged from those that produced death to

[16] See footnote 5.

those that produced no effect after several hours' exposure. The signs of response, fatality, and gross pathology are given. The warning properties as studied by the exposure of persons are described.

1. Hexanone produces narcosis, terminating in death in the higher concentrations. Symptoms are principally eye and nasal irritation, followed by narcosis. Animals that did not die during exposure, recovered.

2. The principal gross pathological findings were congestion and hemorrhage of the lungs, slight congestion of the brain, and moderate congestion of the liver and kidneys, as observed in the autopsies performed immediately after exposure.

3. At room temperature it was not possible to attain a concentration that would kill in a few minutes. Exposure to 1 to 2 percent vapor is considered dangerous to life of guinea pigs after 30 to 60 minutes; 0.4 to 0.6 dangerous to life after several hours; and 0.15 the maximum amount to which guinea pigs may be exposed for several hours without serious disturbance.

4. The commercial hexanone used in the experiments had a distinct odor and was moderately irritating to the nose and eyes of human beings in a concentration (0.1 percent) found to be apparently harmless to guinea pigs after several hours' exposure. The approximate inflammable limits are 1.2 (lower) and 8 percent (upper) by volume in air. The inflammable range is extremely disagreeable to human beings from the standpoint of odor and eye and nasal irritation.

ACKNOWLEDGMENTS

Acknowledgment, with thanks, is made to Surgeon R. R. Sayers, United States Public Health Service, formerly Chief of the Health and Safety Branch, United States Bureau of Mines, for consultation and advice in this investigation, and to John Chornyak, formerly medical officer in charge of the pathological laboratory, and S. H. Black, formerly assistant surgeon, United States Bureau of Mines, for making the pathological examinations.

FOOT DEFECTIVENESS IN SCHOOL CHILDREN[1]

Results of the Examination of 282 School Children, Mostly Colored, in New York City

Reported by MAURICE J. LEWI, M. D., *President, The Foot Clinics of New York*

Through the cooperation of Dr. A. L. Aldinger, director of health education of the city of New York, and his staff, a foot survey of 282 school children, mostly colored, was conducted by staff members of The Foot Clinics of New York, under the direction of Otto F.

[1] For earlier reports on foot defectiveness in school children of New York City, see the Public Health Reports for Nov 4, 1921, pp 2725-2727, and Mar. 27, 1925, pp 605-609

Schuster, assisted by George A. Smith, Jr. The examining group consisted of three orthopedic surgeons and nine podiatrists. The age of the pupils examined ranged from 7 to 14 years.

As in previous surveys, it was noted that postural defects accompanied mechanical defects, especially weak-foot conditions. The percentage of mechanical defects found in boys was approximately the same as that in previous surveys. It is interesting to note that, in this group, the percentage of mechanical defects in girls, which is usually greater by from 10 to 15 percent, was surprisingly low in this school. This is rather an unusual phenomenon and may be attributed to the fact that 95 percent of the children examined were colored, whereas in previous surveys made by this institute the children examined were either all white or predominantly white. Most of the deviations from the normal were of a character that would permit of correction if properly treated.

Foot defects found among 282 school children (mostly colored) in New York City, 1936

[Boys, 67; girls, 215]

Defect	Boys	Girls
Improper mode of walking ..... percent	34	32
Defective posture ..... do	37	25
Improper foot gear ..... do	58	61
Superficial defects ..... do	33	32
Weak foot ..... do	69	57
Functionally impaired anterior metatarsal arch ..... do	32	33
Hallux valgus [1] ..... do	0	33

[1] Including all minor deflections of the great toe.

DEATHS DURING WEEK ENDED APRIL 25, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr 25, 1936	Corresponding week, 1935
Data from 86 large cities of the United States		
Total deaths	9,302	9,014
Deaths per 1,000 population, annual basis	13 0	12 6
Deaths under 1 year of age	612	606
Deaths under 1 year of age per 1,000 estimated live births	55	56
Deaths per 1,000 population, annual basis, first 17 weeks of year	13 6	12 6
Data from industrial insurance companies		
Policies in force	68,464,868	67,826,175
Number of death claims	14,880	14,265
Death claims per 1,000 policies in force, annual rate	11 4	11 0
Death claims per 1,000 policies, first 17 weeks of year, annual rate	10 9	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended May 2, 1936, and May 4, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 2, 1936, and May 4, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935
New England States:								
Maine	1	2	3	3	210	176	0	0
New Hampshire		1		1	50		0	0
Vermont					595	41	0	0
Massachusetts	5	8			1,460	427	5	4
Rhode Island					36	518	1	1
Connecticut	5	2	1	5	167	1,403	2	0
Middle Atlantic States:								
New York	44	23	[1] 7	[1] 5	2,825	3,149	20	24
New Jersey	12	26	12	16	393	1,908	3	5
Pennsylvania	40	36			1,135	4,283	20	9
East North Central States:								
Ohio	31	16	120	6	527	1,808	29	6
Indiana	5	11	64	34	17	467	4	7
Illinois	32	47	68	26	33	2,322	18	29
Michigan	11	15	9	2	90	6,587	4	2
Wisconsin	5	3	63	32	116	1,727	2	1
West North Central States:								
Minnesota	2	7	2	1	550	597	4	2
Iowa	2	5	15	91	7	665	2	5
Missouri		29	247	31	20	528	8	14
North Dakota	1	2	3	5	2	30	0	1
South Dakota	4	4	3	2	6	67	0	0
Nebraska	3	5		2	32	373	1	2
Kansas	1	14	22	15	20	1,136	1	1
South Atlantic States:								
Delaware	1	1			24	4	0	0
Maryland [2]	6	8	10	4	342	77	14	9
District of Columbia	7	7	3		126	60	8	9
Virginia	17	13	235		132	509	8	7
West Virginia	11	10	59	35	66	390	9	11
North Carolina	9	12	30	21	48	341	4	0
South Carolina	4	2	223	142	63	29	7	0
Georgia [3]	10	2					3	0
Florida	2	4	19	5	21	28	4	0
East South Central States:								
Kentucky	4	10	119	9	75	450	31	0
Tennessee	7	13	298	35	58	41	7	7
Alabama [3]	11	19	223	35	20	175	3	1
Mississippi [3]	5	5					1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 2, 1936, and May 4, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935
West South Central States:								
Arkansas	11	2	146	16	1	60	0	3
Louisiana	8	19	46	1	52	70	7	0
Oklahoma [4]	8	1	215	60	25	194	5	0
Texas [3]	30	34	741	146	584	68	6	1
Mountain States:								
Montana [3]	3	6	18	41	17	445	0	1
Idaho			1		29	6	1	0
Wyoming [3]	1	2			2	27	0	0
Colorado	2	5			41	247	0	1
New Mexico	3	6	3		38	31	0	0
Arizona	6	1	59	10	212	20	2	0
Utah [3]		1			36	7	1	0
Pacific States:								
Washington	1	2	8		309	439	2	3
Oregon [5]		4	48	22	210	264	0	2
California	29	25	148	48	2,217	1,595	4	7
Total	400	470	3,300	905	13,129	33,879	246	175
First 18 weeks of year	10,159	11,999	129,988	98,034	167,826	490,633	4,322	2,487

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935
New England States:								
Maine	0	0	18	5	0	0	0	0
New Hampshire	0	0	8	23	0	0	0	0
Vermont	0	0	5	9	0	1	0	0
Massachusetts	0	1	251	210	0	0	0	4
Rhode Island	0	0	18	9	0	0	0	1
Connecticut	0	1	50	90	0	0	2	1
Middle Atlantic States:								
New York	2	0	910	961	0	0	14	3
New Jersey	0	0	400	164	0	0	6	3
Pennsylvania	1	0	460	590	0	0	16	8
East North Central States:								
Ohio	1	0	674	731	0	0	21	3
Indiana	0	0	178	131	1	0	1	0
Illinois	0	1	684	1,269	7	0	1	4
Michigan	0	1	328	331	1	1	6	5
Wisconsin	0	0	574	427	11	16	1	0
West North Central States:								
Minnesota	0	2	306	413	7	5	0	0
Iowa	0	0	248	91	37	0	0	0
Missouri	0	1	274	64	11	0	2	0
North Dakota	0	0	30	126	4	0	1	0
South Dakota	0	0	70	13	23	11	1	0
Nebraska	0	0	149	57	17	35	0	1
Kansas	2	0	373	75	42	36	0	3
South Atlantic States:								
Delaware	0	0	4	5	0	0	0	1
Maryland [3]	0	1	72	123	0	0	2	1
District of Columbia	0	0	23	78	0	0	1	0
Virginia	2	1	72	36	0	0	3	5
West Virginia	0	0	46	64	0	0	7	5
North Carolina	0	2	17	9	0	0	0	4
South Carolina	1	0	1	7	0	2	3	4
Georgia [3]	0	0	16		0	0	7	11
Florida	1	0	6	4	0	0	2	5
East South Central States:								
Kentucky	0	0	28	33	0	1	4	15
Tennessee	0	1	23	19	0	0	5	2
Alabama [3]	0	0	4	6	1	0	2	3
Mississippi [3]	0	0	4	7	0	0	1	5

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 2, 1936, and May 4, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935	Week ended May 2, 1936	Week ended May 4, 1935
West South Central States:								
Arkansas	0	1	3	2	0	2	1	2
Louisiana	0	2	13	17	0	0	5	15
Oklahoma [4]	0	0	54	13	1	3	1	6
Texas [3]	1	0	85	30	1	7	10	5
Mountain States:								
Montana [5]	0	0	87	10	8	4	0	0
Idaho	0	0	19	4	0	0	0	0
Wyoming [5]	0	0	47	37	8	17	0	0
Colorado	0	0	93	251	2	5	0	0
New Mexico	0	1	51	10	0	6	0	6
Arizona	0	0	18	51	0	0	0	1
Utah [2]	0	0	57	129	2	0	0	0
Pacific States:								
Washington	0	2	82	61	10	57	1	1
Oregon [5]	0	0	26	-------	26	9	0	1
California	0	3	276	199	6	21	5	4
Total	11	21	7,295	7,003	226	239	132	128
First 18 weeks of year	316	430	138,534	129,474	4,124	3,457	2,016	2,394

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever; week ended May 2, 1936, 17 cases, as follows: Georgia, 1; Alabama, 2; Texas, 14.
[4] Exclusive of Oklahoma City and Tulsa.
[5] Rocky Mountain spotted fever, week ended May 2, 1936, 9 cases, as follows. Montana, 6; Wyoming, 2; Oregon, 1.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
February 1936										
Puerto Rico	-------	59	43	1,191	14	1	0	-------	0	30
March 1936										
Montana	4	8	121	-------	66	-------	0	522	43	3
April 1936										
Arkansas	7	30	2,327	77	18	25	1	44	1	4
Delaware	1	7	-------	-------	81	-------	0	25	0	1
Nebraska	3	26	5	-------	241	-------	0	642	91	0

February 1936

	Cases
Puerto Rico:	
Chicken pox	18
Dysentery	7
Leprosy	2
Mumps	45
Ophthalmia neonatorum	7
Tetanus	18
Tetanus, infantile	5
Whooping cough	48

March 1936

	Cases
Montana:	
Chicken pox	88
German measles	7

March 1936—Continued

	Cases
Montana—Continued.	
Impetigo contagiosa	2
Mumps	578
Septic sore throat	7
Vincent's infection	2
Whooping cough	36

April 1936

	Cases
Chicken pox:	
Arkansas	76
Delaware	55
Nebraska	161

April 1936—Continued

	Cases
German measles:	
Delaware	7
Mumps:	
Arkansas	272
Delaware	140
Nebraska	192
Septic sore throat:	
Nebraska	9
Whooping cough:	
Delaware	61
Nebraska	32

WEEKLY REPORTS FROM CITIES

City reports for week ended Apr. 25, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	3	2	0	0	0	0	28
New Hampshire:											
Concord	0	------	0	0	1	0	0	1	0	0	7
Manchester	0	------	2	3	0	4	0	0	0	0	18
Nashua	0	------	------	25	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	63	0	0	0	0	0	3	24
Rutland	0	------	0	78	0	0	0	0	0	0	11
Massachusetts:											
Boston	3	------	1	423	32	79	0	14	0	20	252
Fall River	0	------	0	2	2	16	0	1	0	0	23
Springfield	0	------	0	2	0	6	0	0	0	1	32
Worcester	0	------	0	51	10	8	0	3	0	2	67
Rhode Island:											
Pawtucket	------	------	------	------	------	------	------	------	------	------	------
Providence	0	------	1	27	6	15	0	1	0	9	85
Connecticut:											
Bridgeport	0	------	0	5	1	6	0	3	0	2	35
Hartford	0	------	0	0	3	6	0	5	0	7	34
New Haven	0	2	0	1	2	1	0	0	0	66	30
New York:											
Buffalo	1	------	1	45	20	43	0	4	0	4	163
New York	43	15	8	2,284	139	402	0	105	2	75	1,596
Rochester	1	------	0	0	2	5	0	1	0	2	56
Syracuse	0	------	0	102	9	15	0	1	0	2	51
New Jersey:											
Camden	0	1	0	7	6	8	0	3	0	5	44
Newark	0	4	2	8	6	122	0	7	0	22	118
Trenton	1	------	0	1	2	3	0	4	0	8	43
Pennsylvania:											
Philadelphia	2	5	4	614	50	76	0	20	2	108	561
Pittsburgh	7	6	3	18	25	73	0	9	1	26	179
Reading	0	------	0	11	1	2	0	2	0	1	34
Scranton	0	------	------	0	------	4	0	------	0	0	------
Ohio:											
Cincinnati	1	------	3	24	21	32	0	10	0	0	138
Cleveland	3	37	12	79	31	65	0	7	0	98	210
Columbus	1	3	3	3	5	7	0	8	0	6	94
Toledo	0	3	3	47	10	6	0	7	0	30	81
Indiana:											
Fort Wayne	0	------	0	0	5	10	0	0	0	0	33
Indianapolis	1	------	0	2	25	65	0	8	0	8	128
Muncie	0	------	0	0	1	1	0	0	0	0	9
South Bend	0	------	2	1	4	7	0	0	0	4	23
Terre Haute	1	------	0	1	0	6	0	0	0	0	28
Illinois:											
Alton	0	------	1	0	2	2	0	0	0	0	9
Chicago	14	13	6	12	78	242	0	53	2	131	854
Elgin	0	------	0	0	1	4	0	0	0	0	12
Moline	0	1	1	0	1	9	0	1	0	8	13
Springfield	0	------	0	0	6	7	0	0	0	2	29
Michigan:											
Detroit	6	9	5	53	45	112	0	14	2	252	276
Flint	0	------	0	2	13	23	0	4	0	16	40
Grand Rapids	0	------	0	11	0	0	0	1	0	3	29
Wisconsin:											
Kenosha	0	------	0	1	1	11	0	0	0	0	9
Madison	0	------	0	3	2	9	1	1	0	6	24
Milwaukee	0	3	3	5	7	68	0	1	0	79	103
Racine	0	------	0	0	0	14	0	0	0	0	4
Superior	0	------	0	0	1	25	0	0	0	0	12
Minnesota:											
Duluth	0	------	0	2	1	6	0	0	0	16	24
Minneapolis	0	------	1	162	11	131	0	2	0	22	106
St. Paul	0	------	0	130	11	37	0	5	0	1	61
Iowa:											
Cedar Rapids	0	------	------	0	------	4	0	------	0	1	------
Davenport	0	------	------	0	------	13	0	------	0	0	------
Des Moines	1	------	------	0	------	4	1	------	0	1	44
Sioux City	0	------	------	0	------	17	27	------	0	0	------
Waterloo	0	------	------	0	------	5	0	------	0	0	------

City reports for week ended Apr. 25, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	0	-	2	0	17	98	0	5	0	1	101
St. Joseph	-	-	-	-	-	-	-	-	-	-	-
St. Louis	9	-	6	8	20	72	0	10	0	10	266
North Dakota:											
Fargo	0	-	0	0	1	6	1	0	0	0	16
Minot	0	-	0	0	0	1	0	0	0	0	6
South Dakota:											
Aberdeen	0	-	-	0	-	0	0	-	0	0	-
Sioux Falls	0	-	0	0	0	6	15	0	0	0	8
Nebraska:											
Omaha	9	-	1	5	12	68	9	0	0	2	61
Kansas:											
Lawrence	0	2	0	1	0	8	0	0	0	0	6
Topeka	-	-	-	-	-	-	-	-	-	-	-
Wichita	2	-	0	0	8	41	0	0	2	1	32
Delaware:											
Wilmington	0	-	0	3	5	0	0	0	0	8	31
Maryland:											
Baltimore	0	10	2	215	25	32	0	16	0	52	258
Cumberland	1	-	0	0	2	2	0	0	0	0	17
Frederick	0	-	0	6	0	0	0	0	0	0	2
Dist. of Columbia:											
Washington	13	2	0	121	30	18	0	15	0	34	192
Virginia:											
Lynchburg	1	-	0	3	0	0	0	0	0	5	7
Norfolk	0	-	0	0	3	3	0	1	1	0	37
Richmond	1	-	0	1	2	39	0	3	0	0	65
Roanoke	0	-	0	0	2	3	0	0	1	0	16
West Virginia:											
Charleston	1	2	0	1	4	0	0	3	0	0	21
Huntington	0	-	0	0	0	1	0	0	0	0	-
Wheeling	1	-	0	19	0	5	0	0	0	2	21
North Carolina:											
Gastonia	0	-	1	0	1	1	0	0	0	0	10
Raleigh	0	-	0	0	4	0	0	1	0	3	27
Wilmington	0	-	0	0	2	0	0	1	0	0	11
Winston-Salem	0	2	1	26	2	2	0	2	0	0	19
South Carolina:											
Charleston	0	10	0	0	0	1	0	1	1	0	19
Columbia	-	-	-	-	-	-	-	-	-	-	-
Florence	0	-	0	0	0	0	0	2	0	0	10
Greenville	0	-	0	14	0	0	0	0	0	0	10
Georgia:											
Atlanta	4	1	1	1	11	10	0	7	0	0	96
Brunswick	0	-	0	0	1	0	0	0	0	0	5
Savannah	1	33	1	0	2	1	0	1	1	0	18
Florida:											
Miami	3	9	0	6	2	2	0	2	0	8	29
Tampa	0	4	4	9	4	2	0	0	0	0	27
Kentucky:											
Ashland	1	-	0	0	0	1	0	0	0	9	
Covington	2	-	0	2	1	9	0	0	0	0	
Lexington	1	-	0	8	2	0	0	2	0	2	
Louisville	0	-	5	34	12	17	0	3	0	6	
Tennessee:											
Knoxville	0	-	5	22	5	2	0	2	0	0	-
Memphis	0	-	5	2	13	7	0	2	1	10	
Nashville	2	-	4	1	10	4	0	3	0	0	
Alabama:											
Birmingham	1	7	2	0	8	1	0	5	1	0	
Mobile	0	-	0	0	0	1	0	1	0	0	
Montgomery	0	-	-	0	-	0	0	-	0	0	-
Arkansas:											
Fort Smith	-	-	-	-	-	-	-	-	-	-	-
Little Rock	1	-	1	0	9	2	0	1	0	0	
Louisiana:											
Lake Charles	0	-	0	0	5	0	0	0	0	0	
New Orleans	6	38	14	21	19	4	1	15	1	33	
Shreveport	-	-	-	-	-	-	-	-	-	-	-
Texas:											
Dallas	4	6	6	47	7	1	0	4	0	0	
Fort Worth	0	-	3	0	6	2	0	2	0	0	
Galveston	1	-	2	0	1	0	0	2	0	0	
Houston	0	-	2	8	11	1	0	6	0	1	
San Antonio	3	-	4	8	7	4	0	13	0	0	

City reports for week ended Apr. 25, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	0	------	0	0	1	6	0	0	0	2	10
Great Falls	0	------	0	0	1	5	0	0	0	4	12
Helena	0	------	0	0	0	2	3	0	0	0	9
Missoula	0	------	0	0	2	3	0	0	0	0	10
Idaho:											
Boise	0	------	0	8	1	0	0	0	0	0	10
Colorado:											
Colorado Springs	0	------	0	2	0	7	0	0	0	0	11
Denver	1	------	0	28	10	17	0	4	0	25	89
Pueblo	0	------	0	2	2	20	0	0	0	6	8
New Mexico:											
Albuquerque	0	------	0	1	2	9	0	4	0	0	19
Utah:											
Salt Lake City	0	------	0	15	3	30	2	1	0	12	28
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	6	177	7	23	1	9	1	4	96
Spokane	0	2	2	7	1	30	0	0	0	16	29
Tacoma	0	------	0	26	3	2	0	1	0	0	38
Oregon:											
Portland	0	------	1	32	5	10	0	0	0	10	83
Salem	1	5	------	7	------	1	3	------	0	0	------
California:											
Los Angeles	6	27	3	576	18	49	0	22	0	28	328
Sacramento	3	1	0	2	1	2	0	2	5	7	22
San Francisco	0	3	0	348	15	85	0	10	0	41	179

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	2	2	0
Rhode Island:			
Providence	0	1	0
New York:			
Buffalo	3	5	0
New York	18	6	0
New Jersey:			
Newark	2	0	0
Pennsylvania:			
Philadelphia	1	0	0
Pittsburgh	2	0	0
Reading	1	0	0
Ohio:			
Cincinnati	6	2	0
Columbus	1	0	0
Illinois:			
Chicago	14	3	0
Moline	1	1	0
Michigan:			
Detroit	2	1	0
Wisconsin:			
Milwaukee	1	1	0
Missouri:			
Kansas City	2	0	0
St. Louis	1	3	0
North Dakota:			
Fargo	0	1	0
Maryland:			
Baltimore	15	9	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
District of Columbia:			
Washington	4	2	0
Virginia:			
Lynchburg	1	0	0
Richmond	0	2	0
West Virginia:			
Huntington	2	0	0
North Carolina:			
Raleigh	1	0	0
South Carolina:			
Charleston	2	1	0
Georgia:			
Atlanta	2	0	0
Florida:			
Miami	1	0	0
Tampa	1	0	0
Kentucky:			
Louisville	1	0	0
Tennessee:			
Knoxville	1	1	0
Nashville	4	0	0
Texas:			
Galveston	4	1	0
New Mexico:			
Albuquerque	0	1	0
Utah:			
Salt Lake City	0	1	0
California:			
Los Angeles	5	3	1
San Francisco	1	0	0

Pellagra.—Cases: Philadelphia, 2; Wilmington, N. C., 1; Winston-Salem ,1; Atlanta ,1 ,Birmingham, 3; Dallas, 1; Los Angeles, 1; San Francisco, 1.
Smallpox.—Deaths: New Orleans, 1.
Typhus fever.—Cases: Mobile, 1; Fort Worth, 1; Houston, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended April 18, 1936.—During the 2 weeks ended April 18, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	4				1	6
Chicken pox		9		130	320	18	32	10	58	577
Diphtheria		8	5	23	8	3	1		1	49
Dysentery					2		1			3
Erysipelas		1		12	9	8		5	4	39
Influenza		16			34	30	11		1,374	1,465
Lethargic encephalitis					1					1
Measles		29	55	1,163	3,604	382	676	203	1,562	7,674
Mumps			5		1,027	33	132	30	212	1,439
Paratyphoid fever					1					1
Pneumonia		5			37		3		17	62
Poliomyelitis								1	1	2
Scarlet fever		21	3	155	457	95	49	59	40	879
Trachoma							1			1
Tuberculosis	3	5	18	117	107	28	28	3	48	357
Typhoid fever		2	1	58	2	7	2	11	2	85
Undulant fever				1	14					15
Whooping cough		12	15	92	319	4	33	4	32	511

CZECHOSLOVAKIA

Communicable diseases—February 1936.—During the month of February 1936, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	1		Paratyphoid fever	10	
Cerebrospinal meningitis	3		Poliomyelitis	16	3
Chicken pox	205		Puerperal fever	42	20
Diphtheria	2,128	139	Scarlet fever	2,373	68
Dysentery	4	1	Trachoma	145	
Influenza	716	24	Typhoid fever	299	32
Malaria	18		Typhus fever	26	1

JAMAICA

Communicable diseases—4 weeks ended April 18, 1936.—During the 4 weeks ended April 18, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Poliomyelitis	1	
Chicken pox	3	36	Puerperal fever		3
Dysentery	6	7	Scarlet fever	2	
Erysipelas		3	Tuberculosis	36	78
Leprosy		1	Typhoid fever	9	83

PANAMA CANAL ZONE

Communicable diseases—January–March 1936.—During the months of January, February, and March 1936, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	January		February		March	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chicken pox	4		23		17	
Diphtheria	6		1	1	3	1
Dysentery (amoebic)	28		31	1	24	2
Dysentery (bacillary)	6	1	4		12	1
Leprosy	1	2			2	1
Malaria	67	9	75	1	77	3
Measles	1		1		7	
Meningococcus meningitis			1		2	2
Mumps	2				1	
Paratyphoid fever			2			
Pneumonia		27		23		10
Poliomyelitis	1	1			1	
Trachoma			1			
Tuberculosis		30		16		27
Typhoid fever	2		3		3	1
Typhus fever	2		1		1	
Whooping cough	1		6		7	

YUGOSLAVIA

Communicable diseases—March 1936.—During the month of March 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	20	4	Paratyphoid fever	6	
Cerebrospinal meningitis	15	9	Scarlet fever	460	13
Diphtheria and croup	598	69	Sepsis	12	5
Dysentery	33	2	Tetanus	13	9
Erysipelas	268	5	Typhoid fever	382	43
Influenza	776	4	Typhus fever	113	3
Measles	1,601	60			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for April 24, 1936, pages 522–534. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued May 29, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Ceylon—Kalutara.—On April 13, 1936, 1 case of bubonic plague was reported at Kalutara, Ceylon.

Indochina—Saigon-Cholon.—During the week ended April 25, 1936, 1 fatal case of plague was reported at Saigon-Cholon, Indochina.

Typhus Fever

Chile.—For the period January 23 to February 29, 1936, 430 cases of typhus fever with 94 deaths were reported in Chile by Provinces as follows: Aconcagua, 39 cases, 5 deaths; Arauco, 8 cases, 2 deaths; Bio Bio, 34 cases, 7 deaths; Cautin, 15 cases, 3 deaths; Chiloe, 1 death; Colchagua, 1 case; Concepcion, 50 cases, 7 deaths; Coquimbo, 5 cases, 2 deaths; Maule, 3 cases, 4 deaths; Nuble, 9 cases, 6 deaths; Santiago, 243 cases, 49 deaths; Talca, 3 cases, 3 deaths; and Valdivia, 20 cases, 5 deaths.

China—Hankow.—During the week ended March 28, 1936, 1 case of typhus fever was reported at Hankow, China.

Irish Free State—Mayo County—Swineford.—During the week ended April 11, 1936, 2 cases of typhus fever were reported in Swineford rural district, Mayo County, Irish Free State.

Peru.—During the month of January 1936, 143 cases of typhus fever were reported in Peru by Departments as follows: Arequipa, 11 cases; Ayacucho, 3 cases; Cuzco, 36 cases; Huanuco, 3 cases; Junin, 27 cases; Libertad, 16 cases; and Puno, 47 cases.

Yellow Fever

Bolivia—Department of Santa Cruz.—During the month of February 1936, 2 cases of yellow fever were reported in the Department of Santa Cruz, Bolivia.

Brazil.—Yellow fever has been reported in Brazil as follows: Minas Geraes State—Dores de Campo Formoso, March 26, 1936, 1 case, 1 death, Fructal, April 6, 1936, 1 case, 1 death; Parana State—Arthur Bernardes, April 1, 1 case, 1 death, Cambara, March 26, 2 cases, 2 deaths, Jacarezinho, March 22, 1 case, 1 death, Juguariahyva, March 25, 1 case, 1 death, Londrina, March 25, 1 case, 1 death; Sao Paulo State—Assis, March 11, 1936, 1 case, 1 death, Avare, March 2 to 5, 4 cases, 4 deaths, Batataes, March 10, 1 case, 1 death, Bernardino Campos, March 4, 1 case, 1 death, Faxina, March 9 to 18, 4 cases, 4 deaths, and Pennapolis, March 26, 1 case, 1 death.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 39; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES DURING THE FINAL QUARTER OF 1935 AND THE ENTIRE YEAR[1]

By DEAN K. BRUNDAGE, *Senior Statistician, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

Reports from a group of 33 industrial companies in which cash benefits are paid to employees who are disabled for more than 1 week by sickness or nonindustrial accident show that the frequency of 8-day or longer disabilities among the male employees of these companies was slightly higher in 1935 than in the preceding year (83.7 cases per 1,000 men in 1935 as compared with 79.3 in 1934). These sickness rates are based on reports from the same industrial concerns in the 2 years under review. The average number of male employees having sickness-insurance coverage in this group of corporations was 158,138 in 1935, and 153,970 in 1934.

The increase in the frequency of disabilities lasting more than 1 week was due almost entirely to a higher rate of respiratory diseases in 1935 than occurred in 1934 among the male industrial workers for whom sickness records have been made available. There was no alarming increase in the prevalence of respiratory diseases, however; the rate was even slightly below the average annual incidence of this group of diseases during the preceding 5 years (1930 to 1934 inclusive).

For several respiratory disease categories the frequency rate in 1935 was higher than the average annual incidence during the preceding 5-year period. The respiratory diseases showing rates somewhat unfavorable in comparison with the 5-year average were (*a*) bronchitis (acute and chronic), (*b*) tonsillitis and other diseases of the pharynx and tonsils, and (*c*) pneumonia (all forms).

The number of new cases of respiratory tuberculosis per 1,000 males in the sample of the industrial population under consideration was practically the same in 1935 as in the preceding year and during the 5 years 1930–34 as a whole.

The influenza rate was higher in 1935 than in 1934 by nearly one-fourth (24 percent); nevertheless, the rate was definitely below the average annual incidence of influenza during the years 1930 to 1934, inclusive. The 1935 influenza mortality rate among the

[1] A report covering the third quarter and the first 9 months of 1935 was published in the Public Health Reports for Jan. 31, 1936, vol. 51, no. 5, pp 109–111.

millions of wage earners and their dependents who are insured in the industrial department of the Metropolitan Life Insurance Co. increased 28 percent over the corresponding mortality rate for 1934; but, like the influenza morbidity rate in the group under consideration, it fell short of the average rate of death from this cause during the preceding 5 years.[2]

For nonrespiratory diseases as a whole the morbidity frequency rate in 1935 was slightly higher than in the preceding year, but slightly lower than the average rate for the 5 years. A few disease subgroups in this broad category showed frequency rates in 1935 which may be considered as somewhat unfavorable in comparison with the average annual frequency of these diseases during the preceding 5 years. These subgroups were as follows: (*a*) Appendicitis; (*b*) neuralgia, neuritis, sciatica; (*c*) neurasthenia and kindred conditions; (*d*) maladies of the heart and arteries and of the genito-urinary system; and (*e*) the epidemic and endemic group, exclusive of influenza.

In 1935 the frequency of disabilities lasting longer than one week was below the 5-year average for several important nonrespiratory diseases and conditions. Especially low was the 1935 rate of non-industrial accidents among the male employees under consideration. Disabilities on account of hernia, rheumatism (acute and chronic), diseases of the organs of locomotion, and diseases of the skin occurred during 1935 at rates which were below the average for the 5 preceding years.

FOURTH QUARTER OF 1935

The frequency of 8-day and longer disabilities was slightly greater in the final quarter of 1935 than in the corresponding period of the preceding year, in spite of a decrease of 25 percent in the incidence of influenza and an appreciable reduction in the nonindustrial accident rate.

The favorable health record from the standpoint of diseases of the respiratory system was counterbalanced by an increase of 14 percent in the frequency of nonrespiratory diseases in comparison with the nonrespiratory rate for the fourth quarter of 1934. Nearly all subgroups of the nonrespiratory disease classification showed higher incidence rates than in the final quarter of 1934. The disease groups for which the increase in frequency exceeded 20 percent were as follows, listed in order of the magnitude of the increase in frequency: Neurasthenia and kindred conditions; epidemic and endemic diseases except influenza; diseases of the heart and arteries and nephritis; and the rheumatic group, which includes rheumatism (acute and chronic), diseases of the organs of locomotion, and neuralgia, neuritis, and sciatica.

[2] Statistical Bulletin, Metropolitan Life Insurance Co., vol. 17, no. 1, January 1936, p. 7.

TABLE 1.—*Frequency of disability lasting 8 calendar days or longer in the fourth quarter and in the year 1935, compared with the corresponding periods of 1934. (Male morbidity experience of industrial companies which reported their cases to the United States Public Health Service)*[1]

Diseases and disease groups causing disability [Numbers in parentheses are disease title numbers from the International List of the Causes of Death, fourth revision, Paris, 1929]	Annual number of disabilities per 1,000 men in—				
	Fourth quarter of—		Full year—		
	1935	1934	1935	1934	5 years, 1930–34
Sickness and nonindustrial injuries [2]	80.4	78.3	83.7	79.3	87.5
Nonindustrial injuries	11.3	12.8	10.9	12.3	12.8
Sickness [2]	69.1	65.5	72.8	67.0	74.7
Respiratory diseases	26.0	27.7	29.2	24.9	30.2
Bronchitis, acute and chronic (106)	4.1	3.6	3.7	3.2	3.4
Diseases of the pharynx and tonsils (115a)	4.4	3.7	5.0	4.3	4.2
Influenza and grippe (11)	10.0	13.4	12.9	10.4	15.5
Pneumonia, all forms (107–109)	2.0	2.1	2.3	2.0	2.1
Tuberculosis of the respiratory system (23)	.9	.8	.9	.8	.8
Other respiratory diseases (104, 105, 110–114)	4.6	4.1	4.4	4.2	4.2
Nonrespiratory diseases	43.1	37.8	43.6	42.1	44.5
Diseases of the stomach, cancer excepted (117–118)	3.4	3.0	3.4	3.3	3.6
Diarrhea and enteritis (120)	1.4	1.2	1.1	1.2	1.2
Appendicitis (121)	3.6	3.8	3.9	4.1	3.6
Hernia (122a)	1.5	1.4	1.3	1.5	1.6
Other digestive diseases (115b, 116, 122b–129)	2.8	2.7	2.8	2.9	3.0
Rheumatic group, total	8.7	7.1	8.8	8.5	9.8
Rheumatism, acute and chronic (56, 57)	3.3	2.9	3.9	4.0	4.6
Diseases of the organs of locomotion (156b)	3.0	2.3	2.6	2.7	3.1
Neuralgia, neuritis, sciatica (87a)	2.4	1.9	2.3	1.8	2.1
Neurasthenia and the like (part of 87b)	1.3	.5	1.2	.8	1.0
Other diseases of the nervous system (78–85, part of 87b)	1.4	1.4	1.2	1.4	1.2
Diseases of the heart and arteries and nephritis (90–99, 102, 130–132)	3.9	2.9	3.7	3.3	3.6
Other genitourinary diseases (133–138)	2.4	2.3	2.6	2.4	2.4
Diseases of the skin (151–153)	2.8	2.4	2.7	2.5	2.9
Epidemic and endemic diseases except influenza (1–10, 12–18, 33, 37, 38, part of 39 and 44)	2.6	1.7	2.9	2.5	1.9
Ill-defined and unknown causes (200)	1.8	1.6	2.0	1.7	1.9
All other diseases (19–22, 24–32, 36, part of 39 and 44, 40–43, 45–55, 58–77, 88, 89, 100, 101, 103, 154–156a, 157, 162)	5.5	5.8	6.0	6.0	6.8
Average number of males covered in the record	156,826	153,194	158,138	153,970	148,767
Number of companies included	30	30	33	33	

[1] In 1934 and 1935 the same companies are included.
[2] Exclusive of disability from venereal diseases and a few numerically unimportant causes of disability.

THIRD PAN AMERICAN CONFERENCE OF NATIONAL DIRECTORS OF HEALTH

Held in Washington, April 4–15, 1936, Under the Auspices of the Pan American Sanitary Bureau

The First International Conference of American States (republics) met in Washington in 1889 and effected permanent organization by establishing the Bureau of American Republics, now the Pan American Union, as the executive organ of that conference and of succeeding conferences. There have been seven such conferences. In 1902, in Mexico City, the Second International Conference of American States authorized the creation of a separate, autonomous entity, the International (now the Pan American) Sanitary Conferences. The First Pan

American Sanitary Conference met in Washington in 1902. There have been eight subsequent meetings, in various republics. These conferences, meeting from time to time, elected at each meeting a Directing Council, the Pan American Sanitary Bureau, but this body did not function until the Bureau was reorganized in 1920 by the Sixth Pan American Sanitary Conference, which met in Montevideo, Uruguay. Since that time the work of the Pan American Sanitary Bureau has grown rapidly and steadily, and its influence has each year become more extended.

The Fifth International Conference of American States, which met in Santiago, Chile, in 1923, provided that the Director of the Pan American Sanitary Bureau should call together in conference in Washington once in 5 years all of the directing heads of the Departments of Health of the various American Republics. These meetings, it was directed, should be held in the intervals between the meetings of the Pan American Sanitary Conferences, the next of which (the tenth) is scheduled to meet in Bogotá, Colombia, probably in 1938.

Following is the Acta Final of the Third Pan American Conference of National Directors of Health:

The Third Pan American Conference of National Directors of Health began its sessions in the City of Washington, at 10 a. m., April 6, 1936, in a meeting presided over by the Director General of the Pan American Union, Dr. Leo S. Rowe. Addresses of welcome were made by Hon. William Phillips, Under-Secretary of State of the United States, Dr. Leo S. Rowe, and Dr. Hugh S. Cumming in his capacity of Director of the Pan American Sanitary Bureau; responses were made by General José Siurob, M. D., on behalf of the delegates of the republics represented, and by Dr. Carlos Enrique Paz Soldán, on behalf of the Directing Council of the Pan American Sanitary Bureau. These addresses appear in the General Transactions.

The first plenary session of the conference was held in the afternoon of April 6, under the provisional presidency of Dr. Hugh S. Cumming, Director of the Pan American Sanitary Bureau. Credentials of delegates were approved as follows:

Argentina, Dr. Miguel Sussini; Brazil, Dr. João Barros Barreto; Chile, Dr. Víctor Grossi; Colombia, Dr. Enrique Torres; Costa Rica, Dr. Solón Núñez, Dr. Mariano Rodríguez Alvarado; Cuba, Dr. Domingo Ramos; Dominican Republic, Dr. Rafael Espaillat de la Mota; Guatemala, Lic. Enrique López Herrarte; Haiti, Dr. Rulx Léon; Mexico, General José Siurob, M. D., Dr. Ernesto Cervera, Dr. Gerardo Varela; Nicaragua, Dr. Emigdio Lola; Peru, Dr. Carlos Monge; United States, Dr. Hugh S. Cumming, Dr. Thomas Parran, Dr. F. A. Carmelia, Dr. W. L. Treadway, Dr. R. C. Williams, Dr. John D. Long, Dr. Bolívar J. Lloyd, Dr. George W. McCoy, Dr. J. P. Leake, Dr. C. L. Williams, Dr. L. L. Williams, Dr. J. W. Mountin; Uruguay, Dr. Justo F. González; Venezuela, Dr. Arnoldo Gabaldon.

There were admitted to the conference as *ex officio* members Drs. C. E. Paz Soldán, Lima, Peru, Vice-Director of the Pan American Sanitary Bureau; Waldemar E. Coutts, Santiago, Chile, member, and Miguel E. Bustamante, Mexico, D. F., alternate member of the

Directing Council; and Arístides A. Moll, Scientific Editor of the *Bulletin of the Pan American Sanitary Bureau.*

The following officers of the conference were elected, by acclamation:

President, Dr. Hugh S. Cumming.

Vice presidents: Dr. Miguel Sussini, General José Siurob, M. D., Dr. Solón Núñez, and Dr. Emigdio Lola.

General secretary, Dr. João Barros Barreto.

Executive secretary, Dr. Arístides A. Moll.

The following committees were named:

Credentials: Dr. Miguel Sussini, Dr. João Barros Barreto, and Dr. Waldemar E. Coutts.

Regulations: Dr. Solón Núñez, Dr. Emigdio Lola, and Dr. Domingo Ramos.

Program: Dr. José Siurob, Dr. Víctor Grossi, and Dr. Carlos Monge.

Resolutions: Dr. John D. Long, Dr. Rulx Léon, Dr. João Barros Barreto, Dr. Carlos Enrique Paz Soldán, and Dr. Arístides A. Moll.

Committee to study and report on the topics for consideration by the Tenth Pan American Sanitary Conference: Dr. Bolívar J. Lloyd, Dr. Justo F. González, Dr. Waldemar E. Coutts, Dr. Miguel Bustamante.

Committees to study and present recommendations on the unfinished business of the Ninth Pan American Sanitary Conference:

1. Sanitary regulation of aerial navigation: Yellow fever, malaria, plague:
   Dr. F. A. Carmelia.
   Dr. Ernesto Cervera.
   Dr. Emigdio Lola.
   Dr. João Barros Barreto.
   Dr. Arnoldo Gabaldon.
2. Demography: Graded promotions in health organizations; Pan American scientific institutions; narcotic control:
   General José Siurob, M. D.
   Dr. Sólon Núñez F.
   Dr. Domingo Ramos.
   Dr. Víctor Grossi.
   Dr. Miguel Bustamante.
3. Campaign against tuberculosis; campaign against the venereal diseases; Brucellosis; snake-bite:
   Dr. Miguel Sussini.
   Dr. Rafael Espaillat de la Mota.
   Dr. Carlos Monge.
4. Regulation of the preparation, manufacture, and sale of foods and drugs; milk as a public health problem; nutrition:
   Dr. Justo F. González.
   Dr. Carlos Monge.
   Dr. Gerardo Varela.
   Dr. Enrique López Herrarte.
   Dr. Enrique Torres Herrera.

The meetings held in the morning and afternoon of each day from April 6 to 13, 1936, offered, as is recorded in the General Transactions, a splendid opportunity for an exchange of impressions concerning the many, diverse, and important problems which confront the health authorities of the various republics.

The following motions, resolutions, and votes were discussed and unanimously approved:

VOTES AND RESOLUTIONS

MODERN TRENDS IN PUBLIC HEALTH

The Third Pan American Conference of National Directors of Health, after hearing the reports which have been submitted upon modern tendencies in public health, agrees to recommend, as a factor conducive to success in the development of the health activities of the State, the establishment of scientific services (departments) specially charged with the study of the problems of public health, which departments shall be distinct from those devoted to health administration, properly speaking, but subordinate to the higher health authority; it likewise recommends the continuance of the trend toward the technical unification of health work, aiming at the administrative coordination of health programs; and also the creation or increase of health centers and rural and urban health units with a definite program and a trained personnel dedicating full time to health work, in those countries which do not already have them.

The Third Pan American Conference of National Directors of Health congratulates the delegations which have reported on the topic Modern Trends in Public Health, on the thoroughness which their reports exhibited, and recommends to the Governments of the various American countries the preparation of similar reports for the Tenth Pan American Sanitary Conference.

APPROPRIATIONS FOR HEALTH WORK

The Third Pan American Conference of National Directors of Health deems it advisable, in those countries in which the cities maintain health services and set aside a percentage of their funds for these functions, that, whenever compatible with the form of Government, such services be subordinated administratively to the national health services.

The conference further suggests the advisability of the governments setting aside for the health activities, properly speaking, sums which should be increased as needed, and recommends as a proper criterion for the present, the basis of $1 per capita per year, or its equivalent in the national currency of each country, for the support of the respective services.

SPECIAL HEALTH CAMPAIGNS

The Third Pan American Conference of National Directors of Health deems it advisable that, for special health campaigns, the funds which are appropriated for such ends should be in lump sums, in sufficient quantities, and that their allocation (hiring of personnel, etc.) should be left completely to the discretion of the health authorities.

RURAL SANITATION

The Third Pan American Conference of National Directors of Health, in the interests of rural sanitation, recommends the study in each country of the most appropriate methods of treatment of sewage, and in particular the adoption of economical and practical toilets and septic tanks, installation of which should be obligatory in keeping with sanitary aims.

INDUSTRIAL HYGIENE

The Third Pan American Conference of National Directors of Health recommends to the countries of America:

(1) That campaigns for the prevention of industrial accidents be initiated or intensified; (2) that investigations be made to determine the prevalence of occupational diseases; and (3) that such measures be improved and amplified as tend to (*a*) better the conditions of factories and offices, particularly in regard to illumination, ventilation, sanitary equipment, personal cleanliness, and water supplies; (*b*) better the standards of work, especially for women and children; and (*c*) assure workers a good state of health, controlled through periodical medical examinations and founded upon adequate nutrition both qualitatively and quantitatively speaking, and also sanitary dwelling places.

Also there is recommended the study of pneumoconiosis and the degrees of physical incapacity which it causes, in relation to the climatic conditions of each country.

PRENATAL CARE

The Third Pan American Conference of National Directors of Health recommends, as a means of maternal and infant protection, the extension of free maternity centers.

EDUCATION OF WOMEN

The Third Pan American Conference of National Directors of Health, in the interest of the progress of hygiene on the continent, urges that special attention be accorded the specialized education of women in health matters in the countries of America.

LIFE IN HIGH ALTITUDES

The Third Pan American Conference of National Directors of Health, taking into account the exposition of the delegate of Peru on the health problems created by life in high altitudes, recommends to the countries with inhabited high altitudes the organization of institutes to study the subject, and that reports on these studies be made at the Tenth Pan American Sanitary Conference.

NUTRITION AND ALIMENTATION

The Third Pan American Conference of National Directors of Health, in recognition of the fact that various countries of America have incorporated, in separate organizations or institutions, activities which relate to correct nutrition and alimentation along health lines, recommends:

I. To the countries which have not yet begun this type of work, that they do so as soon as possible;

II. That public education in good nutrition practices forms part of the local health duties, the organization of a trained personnel being advisable for this purpose;

III. That suitable propaganda be instituted to spread knowledge of the correct and varied use of foods, under the scientific supervision of authoritative organizations; and, likewise, that the new knowledge concerning amino-acids, mineral salts, and vitamins be applied to better general nutrition.

IV. That when the existence of deficiency diseases is verified, proper research be made and correct alimentation be instituted according to modern scientific knowledge.

V. That statistics regarding the consumption of the principal foods be published, in order to facilitate comparative studies among the countries of America.

VI. That close cooperation be established between health organizations and agencies charged with the control and distribution of food products, in order to subordinate whenever possible the economic aspects of nutrition to the biological requirements.

VII. That scientific investigations be made of the food products of each country of America, and their nutritive value.

VIII. That infant feeding be supervised, most especially in the first months of life; that when breast feeding is not feasible, modified milk be used; that the employment of wet-nurses should be carefully supervised, considering also the interests of the wet-nurse's child; and that the establishment of mothers' milk stations be considered.

IX. That the study of the alimentation of man in America, in its various phases, as a subject of great importance for the future of the population of the continent, be chosen as a topic for the Tenth Pan American Sanitary Conference.

X. And, finally, that the Pan American Sanitary Bureau should appoint a Committee on Alimentation, as proposed by the Seventh International Conference of American States at Montevideo, in order to comply with the resolutions of previous conferences on this subject.

NARCOTICS

The Third Pan American Conference of National Directors of Health recommends (1) an active campaign against drug addiction in its various manifestations, chiefly through treatment of addicts, suitable isolation, and by a thorough and persistent educational campaign;

(2) That control over the traffic in habit-forming drugs be improved.

(3) Careful investigation of the results obtained by the enforcement of international agreements which subject commerce in drugs to severe restrictions; and, considering the special situation in which American coca-producing countries find themselves, and the effects already produced in them by international pacts, it recommends that the suggestion formerly made again be studied, namely, the possible Americanization of the supply of this drug, by means of direct agreements between the governments of the producing and of the consuming countries, as a step in the development of industrial relations in the pharmaceutical field.

AMEBIASIS

The Third Pan American Conference of National Directors of Health deems advisable the continuance of investigations with the aim of determining, by means of new diagnostic methods, the spread of amebiasis in the Americas, and recommends that the results be reported to the Tenth Pan American Sanitary Conference.

LEPROSY

The Third Pan American Conference of National Directors of Health has seen with satisfaction the progress achieved in the control and care of leprosy, in the countries where this disease is prevalent, and trusts that the work will continue and be amplified, to reduce the dangers and spread of this malady, until its disappearance, as a health problem, from America.

POLIOMYELITIS

The Third Pan American Conference of National Directors of Health recommends to the countries of America the adoption of the measures against infantile paralysis described in Publication No. 90 of the Pan American Sanitary Bureau, with the modifications already or hereafter suggested by experience, without prejudice to the continuance of investigations of this disease.

TRACHOMA

The Third Pan American Conference of National Directors of Health, recognizing the fact that trachoma is contracted principally in infancy, recommends the health education of mothers as an important preventive measure.

VENEREAL DISEASES

The Third Pan American Conference of National Directors of Health advises that in the fight against the venereal diseases, the epidemiologic aspects be considered, in each case, the source of the infection being studied in order to prevent possible new contagions.

MALARIA

The Third Pan American Conference of National Directors of Health, considering the magnitude of the problem of malaria in the greater part of the countries of America, firmly recommends that it be given foremost attention in all programs and plans of health work.

TERCENTENARY OF THE DISCOVERY OF CINCHONA

The Third Pan American Conference of National Directors of Health, considering that the year 1938 marks the third century of medical recognition of the value of cinchona bark, and that in this same year the Tenth Pan American Sanitary Conference will be held in Bogotá, recommends that in the said conference a special program be set aside to commemorate this event, which should preferably include a complete survey of the problem of malaria in America.

CARRIERS OF DISEASE

The Third Pan American Conference of National Directors of Health recommends the study of the problem of carriers in communicable diseases and advises, especially, the determination of the prevalence and the duration of the carrier state, registration of carriers, and practical means of rendering carriers harmless.

VACCINES

The Third Pan American Conference of National Directors of Health recommends to the scientific institutions of American countries that they continue the study of methods of obtaining antismallpox vaccine in the highest condition of efficiency and purity, and that the results be reported to the Tenth Pan American Sanitary Conference.

The Third Pan American Conference of National Directors of Health, believing that antityphoid and antidysenteric vaccines are useful as supplementary means of prophylaxis, recommends that investigations of the oral administration of these vaccines be continued, and that the results obtained be reported to the Tenth Pan American Sanitary Conference.

The Third Pan American Conference of National Directors of Health, after taking into account data and experiences submitted on the use of BCG in some American countries, recommends that the study of this preventive measure be continued with the same care and that the results be considered in the Tenth Pan American Sanitary Conference.

VITAL STATISTICS

The Third Pan American Conference of National Directors of Health recognizes that the securing of complete reports regarding the communicable diseases is a basic requirement for successful public health work, that the problem varies in different localities and in the several countries, and that while it is one that may never be entirely solved, it merits constant thought and consideration by public health officers throughout the world, in order that continual improvement in reporting may be achieved.

EXECUTION OF THE RECOMMENDATIONS OF THE NINTH PAN AMERICAN SANITARY CONFERENCE

The Third Pan American Conference of National Directors of Health has heard with pleasure the report relative to the manner in which the Department of Public Health of Uruguay has tried to carry out the recommendations made by the Ninth Pan American Sanitary Conference, and with this in view, recommends:

That similar reports be presented at future conferences of directors of health, by the health departments of the American countries.

PROGRAM OF THE TENTH PAN AMERICAN SANITARY CONFERENCE

After considering the report of the Committee on Program for the Tenth Pan American Sanitary Conference, the Third Pan American Conference of National Directors of Health recommends that the

following subjects, having received the most votes among the delegates consulted, be included in the program of said conference:

(1) Tuberculosis: Results of the campaign in each country; vaccination with BCG; coordination of activities.
(2) Antiplague campaigns.
(3) Antimalaria campaigns.
(4) Modern trends in the campaign against venereal diseases.
(5) Typhus fever and related diseases.
(6) Diseases produced by viruses.
(7) The problem of carriers in epidemiology.
(8) Rural sanitation, water supplies, disposal of refuse and sewage, dwellings.
(9) Regional diseases.
(10) Preventive and curative vaccines and sera.
(11) Training, selection, promotion, and guaranty of tenure of office for national health officials.
(12) Necessity for the coordination of health work under the national public health services.
(13) Human alimentation and nutrition.
(14) Social security.
(15) Maritime and aerial quarantine measures.
(16) Prenatal and infant hygiene.
(17) Leprosy.

ROCKEFELLER FOUNDATION

The Third Pan American Conference of National Directors of Health lauds the work of the International Board of Health of the Rockefeller Foundation and its cooperation in the sanitary activities of various countries in America, and expresses a wish for its extension to all American countries.

WORK OF THE PAN AMERICAN SANITARY BUREAU

The Third Pan American Conference of National Directors of Health, after hearing the report of the cooperative work performed by the Pan American Sanitary Bureau, expresses its approval and records a vote of applause for this truly Pan American work.

BULLETIN OF THE PAN AMERICAN SANITARY BUREAU

The Third Pan American Conference of National Directors of Health, after considering the policy of the Pan American Sanitary Bureau of distributing to all communities, even the smallest, in America, the *Bulletin* which it publishes monthly, and the high standing reached by this organ for the spread of American health doctrines, in its appearance, as well as in the quality and arrangement of the scientific material published;

Resolves to grant a vote of applause and encouragement to the Pan American Sanitary Bureau for this work and this progress, and to urge it to continue the publication of its official organ along the same lines.

VOTES OF APPLAUSE

The Third Pan American Conference of National Directors of Health awards a special vote of gratitude and applause to Dr. Hugh S. Cumming for the impartial and far-seeing manner in which he has directed its deliberations and organized its work, and extends to him in his retirement as Surgeon General of the United States Public Health Service, best wishes, placing on record a testimonial to the services which he has rendered to the cause of Pan American cooperation in public health.

Likewise it applauds the labor of Dr. Bolivar J. Lloyd for his cooperation, through the Pan American Sanitary Bureau, in the work of obtaining closer relations in health work among the nations of the New World;

And records its approval of the manner in which the Scientific Editor of the *Bulletin*, Dr. Aristides A. Moll, Executive Secretary of the Conference, discharges his duties, which contribute so much to the spread of health knowledge in American countries.

The Third Pan American Conference of National Directors of Health attests its gratitude to Dr. Leo S. Rowe for the most gracious manner in which he has extended his hospitality to the members, and for the use of the facilities in the Building of the Pan American Union.

The Third Pan American Conference of National Directors of Health records its praise of the Secretary General of the Assembly, Dr. João de Barros Barreto, for the manner in which he has contributed to the success of the conference;

Likewise it extends its thanks to Drs. Miguel Sussini, José Siurob, Solón Núñez and Emigdio Lola, vice presidents, for the direction of the sessions over which they have presided.

The Third Pan American Conference of National Directors of Health extends a vote of applause for his valuable work to the Traveling Representative of the Pan American Sanitary Bureau, Dr. John D. Long.

The closing session took place Saturday, April 11, 1936, at 10 a. m., with Dr. Hugh S. Cumming, presiding. On this occasion, addresses were made by Dr. Domingo Ramos, in the name of the visiting delegates; Dr. Justo F. González, in the name of the Directing Council of the Pan American Sanitary Bureau, and by Dr. Hugh S. Cumming. The various addresses were incorporated in the General Transactions of the Conference.

Signed in the city of Washington on the 11th day of April 1936, it having been agreed that a copy of this Act shall be sent to each of the delegations, and furthermore, that a copy shall be sent to each of the American Governments (republics) through diplomatic channels, and

finally, that the original shall be kept in the office of the Pan American Sanitary Bureau.

Signed:

HUGH S. CUMMING, *President*

MIGUEL SUSSINI, *Vice President* (Argentina).
SOLÓN NÚÑEZ, *Vice President* (Costa Rica).
JOÃO BARROS BARRETO, *General Secretary* (Brazil).
MARIANO RODRÍGUEZ ALVARADO (Costa Rica).
VÍCTOR GROSSI (Chile).
F. A. CARMELIA (United States).
R. C. WILLIAMS (United States).
BOLÍVAR J. LLOYD (United States).
J. P. LEAKE (United States).
L. L. WILLIAMS (United States).
ENRIQUE LÓPEZ HERRARTE (Guatemala).
ERNESTO CERVERA (Mexico).
RAFAEL ESPAILLAT DE LA MOTA (Dominican Republic).
JUSTO F. GONZÁLEZ (Uruguay).
C. E. PAZ SOLDÁN (*ex officio*), (Peru).
MIGUEL E. BUSTAMANTE (*ex officio*), (Mexico).
JOSÉ SIUROB, *Vice President* (Mexico).
EMIGDIO LOLA, *Vice President* (Nicaragua).
ENRIQUE TORRES (Colombia).
DOMINGO RAMOS (Cuba).
THOMAS PARRAN (United States).
W. L. TREADWAY (United States).
JOHN D. LONG (United States).
GEORGE W. MCCOY (United States).
C. L. WILLIAMS (United States).
J. W. MOUNTIN (United States).
RULX LÉON (Haiti).
GERARDO VARELA (Mexico).
CARLOS MONGE (Peru).
ARNOLDO GABALDON (Venezuela).
WALDEMAR E. COUTTS (*ex officio*), (Chile).
ARÍSTIDES A. MOLL (*ex officio*), *Executive Secretary* (United States).

ENGINEERING CONTROL OF OCCUPATIONAL DISEASES [1]

By J. J. BLOOMFIELD, *Sanitary Engineer, United States Public Health Service*

The control of occupational diseases lies chiefly within the sphere of two types of workers, the physician and the engineer. It is within the province of the physician to diagnose occupational diseases and primarily to recognize the existence of those diseases due to the factory environment. Based on the findings of the physician, the engineer is in a position to learn where control measures are to be initiated. His functions are twofold: First, he must study the local plant conditions which have been shown to be detrimental to health and by precise quantitative measurements determine the extent of the hazard; second, once the nature and degree of the hazard have been demonstrated, the engineer must consider ways and means for controlling or minimizing the dangerous condition and for studying the effectiveness of these measures.

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It is the purpose of this paper to discuss the various engineering methods which may be applied in the evaluation and control of industrial health hazards.

THE STUDY OF THE WORKROOM ENVIRONMENT

It has been indicated that one of the functions of an engineer in the field of industrial hygiene is the study of the workroom environment, in an effort to determine any relationship between that environment and its effect on the health of the worker. In all such investigations there are certain preliminary steps of fundamental importance which must be undertaken in order to serve as a guide in the more detailed studies which may be indicated. These preliminary steps consist of the sanitary survey and the occupational analysis of the workroom (*1*).

The sanitary survey of a workroom consists of noting items of a general sanitary and hygienic nature, such as provisions for ventilation, illumination, fire protection, accident protection, exposure to specific poisons, such as dusts, fumes, vapors, and gases, fatigue, and so on. In other words, the sanitary survey yields information concerning the presence of various health hazards and serves as a guide in determining which hazards require further study in the form of actual quantitative determinations.

The occupational analysis permits one to learn of the activities involved and the particular hazards associated with each occupation and the number of persons in each occupation. Perhaps a typical illustration from actual experience will demonstrate the value of the preliminary survey of an industrial establishment.

Studies of industrial morbidity among iron and steel workers conducted by the Office of Industrial Hygiene and Sanitation showed that pneumonia, in all forms, occurred to nearly twice the extent among these workers that it did among employees of other industries during a 3-year period of observation (*2*). A 5-year inquiry into the causes of high pneumonia rates among iron and steel workers in a representative mill disclosed the fact that the largest number of cases occurred in certain departments, such as in the blast furnace and open-hearth steel mills. When one realizes, however, that these departments contain anywhere from 60 to 100 different occupations, the task of a preventive program is almost a hopeless one, unless definite information is obtained concerning such important items as (*a*) the number of persons in each occupation, (*b*) the activities associated with each occupation, (*c*) the health hazards associated with each occupation, and (*d*) the incidence of pneumonia for each occupation. Such information is available from a preliminary sanitary and occupational survey.

For example, in the study mentioned it was found that the most important exposures associated with the various occupations were

heat with wide changes in temperature, gases (sulphur dioxide, hydrogen sulphide, and carbon monoxide), dusts, strenuous work, and outdoor labor in all kinds of weather. The preliminary survey enabled one to note these exposures for those occupations in which they occurred. Table 1 presents the frequency of pneumonia according to occupation in the blast furnace department, in relation to the nature of the exposures, during the period of 1924–28. It is quite obvious that the highest pneumonia rates occurred among those occupations exposed to one or more of the potential hazards cited. The actual number of cases for those occupations not associated with these five exposures (all other sections) were found to be even less than the expected cases of pneumonia for such workers. Such a preliminary survey indicated that, in the blast furnace department, attention should be centerea on the occupations in the casting and general labor sections, in an effort to determine the degree of exposure to gases, dusts, extreme temperature changes, and so on. Such studies are carried out by the engineer, whose task it is to determine the extent of the occupational exposure to the materials and conditions enumerated. Once these factors have been evaluated, the engineer is in a better position to initiate control measures for the minimization of the hazards demonstrated to be deleterious to bealth.

TABLE 1.—*Frequency of pneumonia according to occupation and in relation to the nature of industrial exposure involved in the blast-furnace department, 1924–28*

Sections and occupations	Nature and extent of industrial exposure [1]					Annual number of cases of pneumonia per 1,000 men	Number of cases of pneumonia		Approximate number of years of life observed
	Heat with wide changes in temperature	Strenuous work	Outdoor work in all kinds of weather	Gases and smoke	Dust		Actual	Expected [2]	
All sections						14.0	36	10	2,578
Stacks and stoves (casting section)						27.2	17	2	624
Keeper	**	**	*	**	*	8.3	1	0	120
First and second helpers	**	**	*	**	*	41.5	12	1	289
Blowers	*	0	*	*	0	0	0	0	52
Hot-blast men	*	*	**	**	*	16.7	2	1	120
Stove cleaners	*	*	**	**	**	46.5	2	0	43
General labor section and car-dumper laborers	0	0	**	0	0	30.7	15	2	489
All other sections [3]	*	*	*	*	*	2.7	4	6	1,465

[1] Symbols for extent of exposure are as follows: 0, no exposure; *, slight or occasional exposure; **, heavy exposure.

[2] Number expected from the rate per 1,000 men in "All other departments".

[3] 8 percent of the men heavily exposed, 23 percent slightly or occasionally exposed to heat with wide temperature changes. To strenuous work no one was heavily exposed, and only 5 percent had occasionally to work strenuously. To outdoor work in all kinds of weather about 8 percent of the men were heavily exposed, 80 percent slightly or occasionally exposed. To gases and smoke about 5 percent were heavily and 25 percent slightly or occasionally exposed. About 1 percent of the men were heavily exposed to dust, and about 55 percent slightly or occasionally exposed.

The magnitude of the problem confronting the engineer in industrial hygiene is as large as it is varied. According to a recent analysis made by Dublin and Vane (*3*), there are some 94 groups of industrial poisons in the United States, associated with about 900 different occupations. In the limited space allotted for the present discussion it will be possible only to point out a few of the major problems in this field with which the engineer is concerned.

The subject of the health of workers in dusty trades has been receiving considerable attention from students of industrial hygiene and others interested in the various phases of this problem. When one realizes that the workmen employed in the dusty trades comprise the largest group exposed to any one industrial hazard, it is quite apparent that the importance of this problem has not been overestimated. Furthermore, it is by now fairly well established that exposure to certain kinds of dust has increased the mortality rate from respiratory diseases.

As a result of the studies conducted by the Office of Industrial Hygiene and Sanitation and other interested agencies, it has been fairly well established that a knowledge of the properties of a given dust which determine its capacity to produce pulmonary pathology is essential. Numerous investigations of the industrial dust problem indicate that these properties are the chemical and mineralogical composition of the dust, its concentration in the industrial atmosphere, and its particle-size. It is within the province of the engineer to determine these factors in the industrial dust problem. How important these determinations are in such studies is well exemplified by the results of our recent investigation made among anthracite-coal miners (*4*).

In this particular investigation it was found that the various mine and surface workers were exposed not only to different concentrations of dust but also to dusts of varying composition. For this reason, in the present discussion, data will be given for a group of workers inhaling a dust of the same composition. For example, the engineering study disclosed that workers in the mine haulageways were exposed not only to the dust arising from both coal- and rock-working operations but also to the sand dust used on the rails to obtain traction. A study of the composition of this dust showed it to have a total silica content of 34 percent, a quartz content of 13 percent, with 58 percent of the dust consisting of coal. Due to the relatively low dust concentrations in the haulageways, the mine operators did not suspect a health hazard among the men employed in the gangways.

Figure 1 shows the percentage of men having anthraco-silicosis under different average dust concentrations and number of years' exposure to such concentrations. When the duration of employment

or exposure was less than 25 years, only a negligible proportion of the men developed anthraco-silicosis. There were, in fact, only 3 cases among the 408 men examined whose length of employment was less than 25 years, a percentage of less than 1 for this group as a whole. When the exposure exceeded 25 years, about one-fourth of the men were found to have anthraco-silicosis. The curve of cases mounted rapidly from an exposure of 10 to 20 million dust particles per cubic foot of air to 80 million particles, at which exposure about one-third of the men were found to have this disease. It is of interest to note that the curve of cases declined slightly under higher dust exposures. Although one cannot state definitely the reason for this tendency, it may be due to the factor of selection.

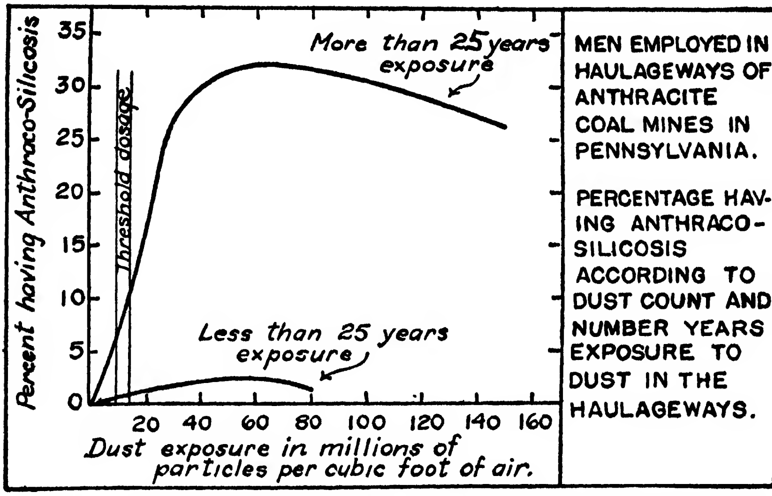

FIGURE 1.—Percentage of men having anthraco-silicosis according to dust concentration and years of exposure.

This single example concerning one of the important problems in industry illustrates the role played by the engineer in the field of industrial hygiene. In the present case not only was the study of the degree and nature of the dust exposure valuable in determining the cause and extent of the hazard, but it served as an aid to the solution of the problem; namely, the removal of the dust to a level indicated as safe by the results of the investigation. The graph also shows the approximate threshold dosage, which may be set tentatively at 10 to 15 million particles per cubic foot for this type of dust. Only 4 cases of anthraco-silicosis were found among the men exposed to 10–20 million particles and none were found at an exposure of less than 10 million particles. With such information, the engineer is in a position to consider ways and means for the suppression of the dust in the haulageways to the concentration which is indicated as safe.

In the studies of occupational diseases due to the inhalation of certain toxic dusts, such as lead and radium, the engineer has also played a valuable role. In a recent study of lead poisoning among storage-battery workers, conducted by the Public Health Service (*5*), it was of importance to determine the relationship between the amount of lead dust inhaled by the men and the incidence and severity of plumbism. Such a study is valuable in that it may indicate the maximum amount of lead which may be inhaled with impunity. Table 2 shows the fundamental correlation between the lead in the air and the rate of plumbism in the major departments of the plant in which our study was made.

TABLE 2.—*Lead exposure and maximum monthly rate of initial compensation cases for plumbism*

Department	Milligrams of lead per 10 cubic meters of air	Maximum monthly rate (per 100)
Mixing	120	44
Pasting	80	12
Burning	5.7	4.4
Casting	1.2	.18

It is evident that a close correlation exists between the lead exposure in different departments and the risk of developing a case of lead poisoning. Of considerable interest is the fact that a more detailed analysis of the clinical and dust findings indicated that 1.5 milligrams of lead dust per 10 cubic meters of air, except for prolonged exposure, is the limit of safety under the conditions encountered in this study. This important finding is of great value to the engineer, since it gives him a basis upon which to develop protective devices in the way of exhaust ventilation, respiratory protection, and so on.

Utilizing the same technique as that employed in the study of the dust problem, the writer conducted a study in 1928 on the health hazards associated with chromium plating (*6*). A study of the amount of chromic acid inhaled by these workers, along with physical examinations, showed that ulceration and perforation of the nasal septum were usually associated with an exposure in excess of 1 milligram of chromic acid in 10 cubic meters of air. These results are shown in detail in table 3. It is observed that a fairly good correlation was found to exist between the intensity of exposure to chromic acid mist and the amount of damage to the nasal mucosa, that part of the respiratory tract usually affected by such exposure. As a result of this finding, it was possible to design chromium plating tanks provided with a certain type and degree of exhaust ventilation which keeps the air at the worker's breathing level completely free from chromic acid, or at least to an amount less than 1 milligram in 10 cubic

meters. In a later portion of this discussion it will be shown exactly how this control problem was handled.

Table 3.—*Occupational history and clinical findings of workers employed in plants engaged in chromium plating*

Case no.	Occupation	Months employed in chromium plating room	Hours per day over tank	Approximate CrO_3 exposure in milligrams per 10 cubic meters	Perforated septum [1]	Ulcerated septum [1]	Inflamed mucosa [1]	Nose bleed	Chrome holes	Remarks
1	Chromium plater	6½	4	15.0	++	–	++	+	+	
2	do	20	4	28.0	++	–	+	+	+	
3	Foreman plater	7	2	25.0	–	++	++	+	–	
4	do	8½	3	25.0	–	++	++	+	–	
5	Chromium plater	3½	4	56.0	–	++	++	+	+	
6	do	¾	7	1.2	–	–	++	+	+	
7	do	¼	7	1.2	–	–	++	+	–	
8	do	7	7	1.2	–	–	++	+	–	
9	do	3	7	1.2	–	–	++	–	+	
10	do	36	4	2 0	–	–	++	–	–	
11	do	5	6	1.2	–	–	+	+	+	
12	do	¾	6	1.2	–	–	+	–	–	
13	do	12	4	28.0	–	–	–	–	–	Used vaseline in nose.
14	do	⅔	2	28.0	–	–	–	–	–	
15	Nickel plater	1½	0	(2)	----	+	+	+	–	Cyanide burns.
16	Racker	8	0	(2)	+	–	+	+	–	
17	do	¾	0	(2)	–	–	+	–	–	
18	do	¾	0	(2)	–	–	+	–	–	
19	Wiper	1¼	0	(2)	–	–	+	–	–	
20	Foreman	0	0	0	–	–	+	–	–	Work in other departments of factory.
21	do	0	0	0	–	–	+	–	–	
22	Clerk	0	0	0	–	–	–	–	–	
23	Inspector	0	0	0	–	–	+	–	–	

[1] ++, marked; +, slight; –, negative.
[2] Unkuown.

It is by now apparent from the few examples given in the present discussion that the engineer's part in industrial hygiene is an important one. Studies of the industrial environment of the type indicated may be said to serve a threefold purpose. First, they enable one to determine the extent of the hazard. This is accomplished by obtaining occupational exposures to the toxic material or condition under consideration. Second, if clinical studies are made, the findings on occupational exposure may indicate the permissible amounts of the toxic material which may be tolerated with safety. Third, quantitative studies of the workroom environment are valuable in the control of a hazard. This is performed by testing the efficiency of any devices which may have been introduced for the minimization of the hazard.

In closing this portion of the discussion it is well to point out that the engineering problems in industrial hygiene will increase in number in the very near future. New processes and chemicals are constantly coming into use and many well-known toxic substances are finding new applications in industry. Our knowledge of these substances as to their action on the body is being augmented by the work of toxi-

cologists and by field studies of the type presented in this paper. It is the engineer's task, once this knowledge is available, to devise ways and means for controlling these injurious materials and conditions, which brings one to a discussion of the main purpose of this paper, namely, the engineering control of occupational diseases.

THE CONTROL OF INDUSTRIAL HEALTH HAZARDS

The control of industrial hazards rests in the hands of the physician and engineer. The physician recognizes the existence of diseases due to the workroom environment and exercises medical supervision and initiates studies designed to eradicate the dangerous conditions. The engineer, once he has determined the extent of a hazard and is armed with a knowledge of the toxicity of the material involved, is in a position to consider methods and equipment for the control of the hazard. No set rules may be established for the mechanical protection to be instituted in an attempt to control an industrial poison. Specific conditions encountered in a plant will determine the type of protection to be employed. In general, there are five methods which may be attempted in the minimization of an industrial poison; these are (1) substitution of a nontoxic material for the toxic one, (2) isolation of the harmful process, (3) wet methods in the case of some dusty processes, (4) exhaust ventilation, and (5) respiratory protection.

The protection of workers against certain dusts known to be toxic may at times be accomplished by the substitution of a nontoxic material for the toxic one. One example of such a procedure is the possible use of a metallic or other type of artificial abrasive for sand in the sandblasting process in those operations in which it is not essential to use sand, a substance high in quartz content (7). Again, the mechanical enclosure or isolation of the dust-creating process also serves to protect the worker. An excellent illustration of this type of protection is afforded by the modern sandblast barrel used in the cleaning of small objects. Sometimes it is possible to protect workers by the substitution of wet for dry processes. This method is illustrated in the results shown in table 4.

TABLE 4.—*Contrasting wet and dry methods of rock drilling and loading*

Processes	Number of samples	Average dust count in millions of particles per cubic foot	
		Dry	Wet
Drilling	23	568	23
Loading	10	636	22

It is apparent from the results presented in table 4 that a tremendous reduction in dust has been effected by the use of wet methods in the case of both the drilling and loading rock operations.

In most dusty processes, however, the most effective means of dust elimination are employing the use of properly designed exhaust ventilation systems. Since in many instances it is difficult, costly, and at times an unnecessary procedure to remove all the dust in the vicinity of a worker, it would be helpful to determine the minimum amount of a certain dust which the worker can apparently tolerate with impunity. Such information can be made available by the type of studies carried out by the Public Health Service (mention of which was made earlier in this paper).

For example, in the anthracite coal study (*4*) it was found that miners exposed to less than 50 million particles of coal dust per cubic foot with less than 5 percent quartz in the dust apparently suffered no disability even after many years of work. In the case of the workers in the haulageways, who were shown to be inhaling a dust with a higher silica content, the safe limit was placed at 10–15 million particles. With such information at hand the engineer is in a better position to study various methods for the suppression of the dust to the safe limit indicated. In certain of the mines under investigation, control measures were already in force, showing that dust may be eliminated to a certain extent and oftentimes to a safe concentration. Table 5 shows the results of an engineering study of the control measures practiced in some of the mines and clearly depicts the effective reduction of dust in many of the occupations.

TABLE 5.—*Summary of results contrasting the dust exposure of mine workers under controlled and uncontrolled working conditions*

Operation	Dust concentration in millions of particles per cubic foot of air		Remarks
	Controlled	Uncontrolled	
Firing charge	40	834	Unless at least 15 minutes elapsed after firing a charge, miners were found to be exposed to high dust concentrations
Loading coal or rock	32	636	By wetting the loaded material the dust count is reduced as shown
Loading coal	4–26	[1] 201–1,138	Mechanical loading decreases the dust exposure as indicated
Drilling	33	568	Wet drilling is effective in reducing the dust concentration Further reduction would necessitate exhaust ventilation
Hauling coal in mines	1.2	17	Wetting coal and empty cars reduces dust in haulageways
Preparation of coal	24	380	Wet breakers reduce dust counts as shown.

[1] The lower result is associated with the hand loading of wet coal while the higher average is based on the hand loading of dry coal

Another example of the methods which are at present in use in an attempt to control industrial health hazards is indicated in the results of a study now in progress in connection with mercurialism among workers in the hatters' fur-cutting industry. Table 6 shows the exposure to mercury dust and vapor of some of the workers in this industry under controlled and uncontrolled working conditions. It is quite apparent that where some measure of control is practiced by such methods as segregation or local exhaust ventilation, a material reduction in the exposure to mercury is effected.

TABLE 6.—*Exposure of hatters' fur workers to mercury dust and vapor under controlled and uncontrolled conditions*

Occupation	Total mercury exposure in milligrams per 10 cubic meters		Method of control
	Uncontrolled	Controlled	
Blowers	4.6	0.7	Local exhaust ventilation.
Shippers	7.2	Trace	Good natural ventilation.
Cutters	4.0	1.8	Local exhaust ventilation.
Sorters	3.8	1.7	Do.
Brushers	3.1	1.2	Do.
Drummers	2.5	.6	Segregation.
Clippers	1.5	.7	Do.

It will be recalled that earlier in this discussion some results were shown in connection with the chromium-plating study which indicated that apparently no harm was involved in an exposure to less than 1 milligram of chromic acid in 10 cubic meters of air, at least as far as damage to the respiratory tract was concerned. While this study was being conducted, exhaust ventilation methods for the removal of chromic acid mist from the air were also being investigated. Figure 2 shows the relation between the degree of air velocity at the exhaust ducts and the amount of chromic acid in the air (*6*). It is evident from this study that in order to keep the chromic acid content in the air to an amount less than 1 milligram in 10 cubic meters (the minimum amount found to cause no damage to the nasal septum) at least 1,500 feet per minute of air movement at the face of the duct is necessary, especially at the higher current densities commonly encountered in electroplating.

Perhaps one additional illustration of the role played by the engineer in the control of industrial hazards may be mentioned at this time, to show the varied and important problems confronting him. In the study conducted in connection with the health hazards involved in the cleaning of castings by means of abrasive blasting (7), it was found that the only practical safeguard to the worker was to provide him with a mask or helmet of the positive-pressure type. In studying the efficiency of such devices it was found that a relationship existed

between the amount of air supplied to the helmet and the concentration of dust inside the helmet during blasting. In an attempt to determine the optimum air volume to be supplied to such protective devices, it was necessary to obtain dust samples from inside the helmet while varying the air volume, at the same time maintaining the dust concentration in the sandblast room (outside the helmet) constant. Figure 3 shows the results of such a study and clearly indicates that the positive supply of 6 cubic feet of dust-free air per minute will protect a worker under the operating conditions now in practice in sandblast rooms. The ultimate criterion of protection, however, is the result of dust determinations of the air within the

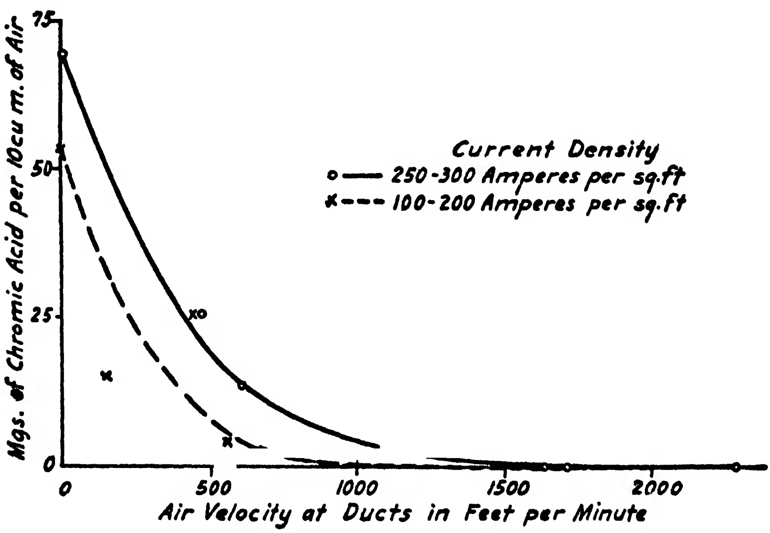

FIGURE 2.—Relation between air velocity of local exhaust system and amount of chromic acid in air for different current densities.

helmet, that is, the air actually breathed by the worker and not the volume of air supplied.

From some of the examples cited in this paper it is apparent that there is some knowledge concerning the effects on health due to exposure to certain toxic materials in industry, and it would seem logical to take appropriate measures for their control. That the problem of industrial hygiene is of considerable magnitude is evinced by the fact that we now know that the industrial population experiences high morbidity and mortality rates, partly as a direct result of the working environment, and, in addition, the number of persons involved is rather large. According to the United States census figures for 1930 (*8*), in the manufacturing, mechanical, and mining industries alone there are some 15 million persons gainfully employed, and so industrial hygienists are at once faced with the task of pro-

viding adequate health services for a large number of workers engaged in occupations that are known to entail an exposure, in many instances, to deleterious materials and conditions.

One is also confronted with the fact that, in this country, the majority of establishments are very small, too small in fact to conduct

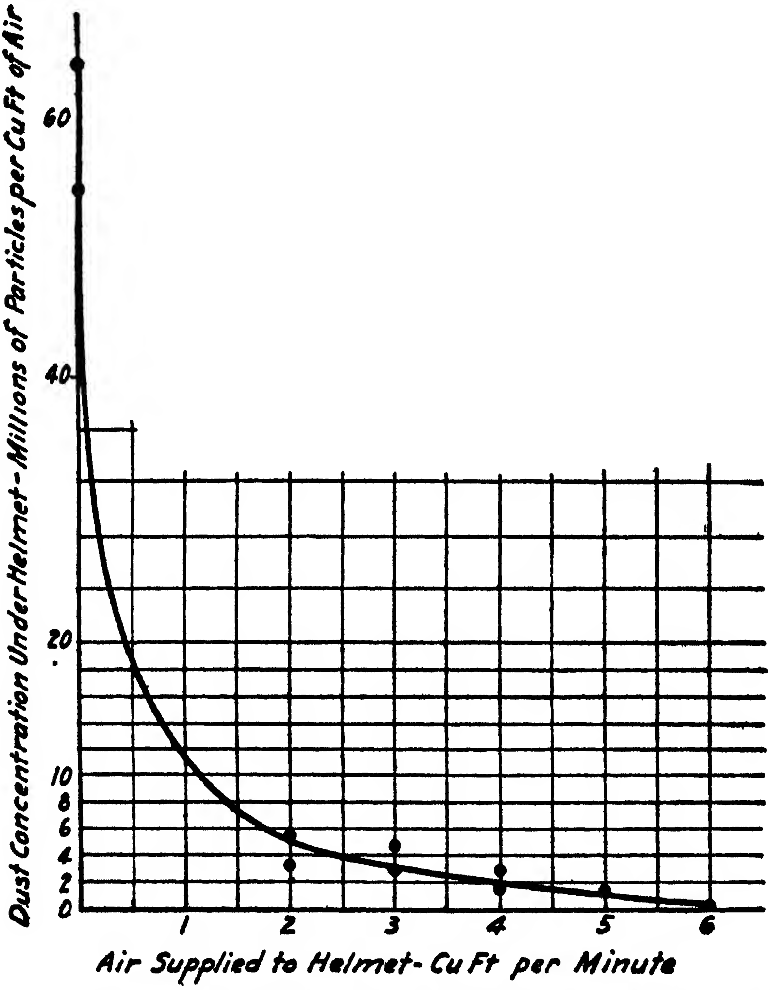

FIGURE 3.—Curve showing relationship between the volume of air supplied to helmets and the number of dust particles in air breathed by worker.

individual programs of industrial hygiene. From a study recently made by the writer in a typical industrial area (*9*), and from the census data of 1930, it is known that approximately 90 percent of the industrial plants in this country employ less than 100 persons. The consensus of opinion among students of this subject is that the needs of industrial hygiene in our industries may best be cared for by local

health departments. In fact, many of the State departments of health are now recognizing the necessity of a preventive program in industry and are considering ways and means for establishing such work as an integral part of their organizations.

It is not the purpose of the present paper to delve into the reasons for the necessity of industrial hygiene work in health departments, except to indicate that once such a program is initiated, the engineer's role in it will be an important one, since the task of prevention will largely lie in his hands. It is probably apparent by now from the brief discussion given herein that, in order for an engineer to carry on such work, he will have to be thoroughly trained in industrial hygiene and be familiar with industrial processes. Such a person should be well grounded from both a theoretical and practical viewpoint in the fields of microscopy, gas chemistry, physiology and mechanics of ventilation, industrial sanitation, illumination, and, most important of all, he should have a broad public health viewpoint. It is apparent that a sanitary, mechanical, or chemical engineer, *per se*, does not exactly fulfill these requirements. But there is no reason why an individual with basic engineering training cannot in time be metamorphosed into an industrial hygiene engineer.

In closing, it is well to emphasize one point; namely, that occupational diseases are in a large measure preventable, and the degree of prevention exercised by a community will be reflected in the general health status of that community.

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CHEMICAL STUDIES ON TUMOR TISSUE

III. Titration of Mouse Tumors[1]

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In the course of studies on the chemical treatment of tumors in mice, the widely employed method of transplanting tumors by means of implantation of tumor fragments gave results which were not satisfactory for some purposes. The transplants produced tumors which would often vary considerably in size and in growth rate. These variations were so great that a slight difference between the tumors of the treated and of the control mice in therapeutic experiments would, if present, be obscured by the greater differences among the individual tumors within each group.

Attempts were therefore made to obtain more regular and more closely reproducible results. First, pure strain mice [2] were substituted for ordinary stock or market mice. In the second place the method of transplanting was modified.

In the commonly used procedures, tumors are transplanted by means of tumor fragments, tumor mashes, or tumor suspensions. The last-named method, somewhat modified, has been employed in the procedure described in this report.

TECHNIQUE

The procedure finally adopted was as follows: Healthy tumor tissue was minced and shaken for one-half hour with glass beads in a solution containing 0.9 percent NaCl and 10 percent gelatin; for each gram of tissue, 10 cc of solution was used. The larger particles were removed by centrifuging at low speed for 2 minutes, and the supernatant fluid, a homogeneous suspension of finely divided tumor tissue, was employed in the titrations. In preparing the less concentrated suspensions, this stock suspension was diluted with the gelatin solution. All solutions were adjusted to pH 7.0 to 7.5 before using.

The gelatin served a double purpose: It both retarded sedimentation and counteracted the destructive swelling of tumor cells that occurs in protein-free solutions but which is retarded by protein (*3*).

The suspensions were all injected subcutaneously in doses of 0.1 or 0.2 cc. The tables show the dosage and the results obtained in the

[1] Read at the Detroit meeting of the Federation of American Societies for Experimental Biology, Apr. 12, 1935 (Jour. Biol. Chem., 109: lxxxi (1935)).

Earlier papers of this series are as follows:

Volume changes of tumor cells in vitro. By M. J. Shear and L. D. Fogg. Pub. Health Rep., 49: 225–240 (1934).

Chemical studies on tumor tissue. II The effect of protein on the swelling of normal and tumor cells of mice in vitro. By M. J. Shear. Am. Jour. Cancer, 23: 771–783 (1935).

[2] The pure strain mice were obtained from the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine. For the characterization of these mice, see reference (1), Andervont (1935).

various experiments. Tumor size is indicated by numbers, which correspond to the estimated average diameters, the average diameter being defined as the arithmetical mean of the three diameters of the tumor. The relation between the arbitrarily chosen numbers for "tumor size" and the corresponding "average diameter" is as follows:

Tumor size	Average diameter
	mm
0	0
1	0.5
2	1
3	2
4	4
5	6
6	8
7	10
8	15
9	20
*	>20

* Denotes a very large tumor.

The description of tumor size by this arbitrary scheme has been found to be a convenient and rapid method of comparing tumor size in experiments in which the measurement and designation of the precise dimensions of the tumors would be cumbersome and of little added value.

EXPERIMENTAL

Sarcoma 180.—In a preliminary experiment a suspension was made by treating 1 g of minced sarcoma 180 tissue with 12 cc of physiological saline containing 5 percent gelatin. This suspension (1:12) was allowed to stand for 15 minutes and the supernatant solution (1:12 A) was then pipetted off. After four-fold dilution, it was centrifuged for 5 minutes and the supernatant solution (1:48 B) was separated. Each of the three suspensions was administered subcutaneously to six strain D mice.

The concentrated suspensions (1:12) gave rise to tumors in a short time in all cases. The lighter suspension (1:12 A) produced only four tumors in six mice; moreover, these tumors appeared more slowly than in the 1:12 group. The most dilute preparation (1:48 B) had produced no tumors by the time the experiment was terminated.

In the next experiment with sarcoma 180 (see table 1), fragments of the tumor were inoculated into 6 mice for comparison with the 3 tumor suspensions which were injected into 3 groups of 10 mice each, respectively. Here, too, the concentrated suspension gave 100 percent "takes", as did the fragments. Centrifuging for only 2 minutes at low speed rendered the solution inactive. With the suspension centrifuged for 1 minute, tumors were obtained in 2 cases out of 10.

TABLE 1.—*Tumors obtained in strain A mice with suspensions of sarcoma 180*

[Gelatin concentration, 10 percent; amount injected, 0.2 cc; number of mice, 36]

Days after inoculation	Tumor size			
	Fragment implants	Dilution of suspension		
		1:10	1:10 A	1:10 B
11	3-3-4 3-3-3	3-3-5-3-8 3-2-4-6-3	0-0-0-0-0 0-0-0-0-0	0-0-0-0-0 0-0-0-0-0
18	5-4-7 4-3-4	6-6-7-6-* 5-4-6-*-4	2-0-0-0-3 0-0-0-0-0	0-0-0-0-0 0-0-0-0-0
39	8-7-* 9-4-8	8-*-*-*-* 8-*-*-*-*	4-0-0-0-7 0-0-0-0-0	0-0-0-0-0 0-0-0-0-0

A denotes preparation centrifuged for 1 minute
B denotes preparation centrifuged for 2 minutes
The size of each tumor is designated by a number, from 1 to 9, corresponding to the "average diameter"; 0 denotes tumor absent, * denotes a very large tumor.

Dibenzanthracene sarcoma (strain A, first and second transplants).—From the preceding experiments it was obvious that centrifuging for only a few minutes rendered the suspensions of sarcoma 180 inactive, even in the case of the 1:10 concentration. Since sarcoma 180 is a tumor that has been passed for many years through mice of widely diverse genetic constitution, it was thought that perhaps better results might be obtained with dilute suspensions if a tumor were used that had arisen originally in a pure-strain mouse and that had been propagated only in mice of the same strain.

Accordingly, the next experiment was performed with a sarcoma that had originally been induced in a strain A mouse by means of 1, 2, 5, 6-dibenzanthracene and which had been transplanted once in this strain. Fragments of the transplanted tumor were implanted into six mice for comparison; six other mice received 0.1 cc of a 1:10 suspension. After centrifuging for 2 minutes, the suspension (1:10 B) was injected into six mice. Finally, after 10-fold dilution, it (1:100 B) was also injected. All the mice were of the same pure strain.

Positive results were obtained in all the mice which had received tumor fragments or the 1:10 suspensions. In the latter cases, however, it took longer for the tumors to become evident than in the fragment implant group. Furthermore, it is to be noted that the tumors produced by the centrifuged suspension (1:10 B) developed more slowly than those produced by the uncentrifuged suspension. The 1:100 B suspension had the longest latent period; but even at this dilution tumors were obtained in five of the six mice by the end of 1 month.

Since positive results were obtained with the centrifuged preparations even at the 1:100 dilution, the experiment was repeated, using the next generation of this same tumor, and increasing the dilution of

the centrifuged suspension to 1:1,000. The results are summarized in table 2.

Table 2.—*Tumors obtained in strain A mice with suspensions of a dibenzanthracene sarcoma*

[Tumor history: Second transplant of a sarcoma induced by dibenzanthracene in a strain A mouse: gelatin concentration, 10 percent; amount injected, 0 1 cc, number of mice, 43]

Days after inoculation	Tumor size			
	Fragment implants	Dilution of suspension		
		1:10 B	1:100 B	1:1,000 B
6	3-2-2-1	0-0-0-0-0-0	0-0-0-0-0-0	0-0-0-0-0-0
	4-1-2-0	0-0-0-0-0-0	0-0-0-0-0-0	0-0-0-0-0
12	5-3-4-3	0-0-0-0-0-0	0-0-0-0-0-0	0-0-0-0-0-0
	5-5-5-3	1-0-0-0-0-0	0-0-0-0-0-0	0-0-0-0-0-0
19	9-4-6-4	0-2-1-0-0-0	1-0-0-0-0-0	0-0-0-0-0-0
	8-9-8-7	2-2-0-2-2-2	1-2-1-0-1-0	0-0-0-0-0
33	*-7-*-7	3-7-6-4-4-4	3-1-2-0-2-1	0-0-0-0-0-0
	--*-9	6-4-3-4-4-3	3-4-4-0-2-0	0-0-0-0-0
61	*-*-*-*	*-*-*-*-*-*	9-6-8-8-5	0-0-0-0-0-0
	--*-*	*-*-*-*-*-*	7-6-6-1-3	0-0-0-0-0

B denotes preparations centrifuged for 2 minutes.
The size of each tumor is designated by a number, from 1 to 9, corresponding to the average diameter; 0 denotes tumor absent, * denotes a very large tumor.

As before, tumor fragments gave rise to tumors rapidly. The centrifuged 1:10 and 1:100 preparations also gave rise to tumors in all cases, but more slowly; again, the greater the dilution, the longer the latent period. The 1:1,000 dilution produced no tumors in 61 days.

Dibenzanthracene sarcoma (strain D; twelfth and thirteenth transplants).—The results obtained in the two experiments with a strain A dibenzanthracene sarcoma in strain A mice were in satisfactory agreement. Similar experiments were thereupon carried out, using strain D mice, with twelfth and thirteenth transplants of a sarcoma originally induced in a strain D mouse by 1, 2, 5, 6–dibenzanthracene and subsequently carried in strain D mice only.

In the first of the experiments with this tumor (see table 3), results similar to those obtained with the strain A sarcoma were obtained. However, there was one striking difference: with the strain A sarcoma no tumors were obtained with the 1:1,000 dilution, whereas the corresponding dilution of the strain D tumor produced tumors in five out of eight mice. On repeating[3] the experiment with the strain D sarcoma, tumors were again obtained at the 1:1,000 dilution. Furthermore, the 1:10,000 dilution produced a tumor in 1 of 10 mice. As in

[3] Some of the mice receiving the concentrated suspensions failed to develop tumors in this experiment. This is an unusual occurrence. It may possibly have been due to accidental inclusion of some mice of a different strain; this could account for the failure to obtain tumors in those mice. Or possibly in some instances the injected material may have been infected; this could also account for the negative results.

the preceding titrations, the tumors that were produced had a latent period which was longer the greater the dilution.

TABLE 3.—*Tumors obtained in strain D mice with suspensions of a dibenzanthracene sarcoma*

[Tumor history Twelfth transplant of a sarcoma induced by dibenzanthracene in a strain D mouse; gelatin concentration, 10 percent, amount injected, 0 1 cc, number of mice, 32]

Days after inoculation	Tumor size			
	Dilution of suspension			
	1:10 B	1:50 B	1:250 B	1:1,000 B
12	3-2-0-3	0-0-0-0	0-0-0-0	0-0-0-0
	3-4-0-4	0-0-1-0	0-?-0-0	0-0-0-0
18	7-5-4-5	1-3-3-1	2-3-0-2	0-0-0-0
	5-8-4-5	1-2-4-1	1-4-0-3	1-2-0-1
32	*-8-*-*	8-9-8-2	8-9-2-4	0-2-0-1
	--*-*	1-7-9-4	9-*-3-*	3-7-0-2
39	*-*-*-*	*-*-9-4	9-*-4-6	0-4-0-2
	--*-*	3-8-9	*-*-5-*	5-8-0-4

B denotes preparations centrifuged for 2 minutes
The size of each tumor is designated by a number, from 1 to 9, corresponding to the average diameter
0 denotes tumor absent, * denotes a very large tumor

Carcinoma 29,225 (first and second transplants).—The preceding experiments had all been carried out with sarcoma tissue. In the succeeding experiments, carcinoma tissue was employed. Titrations were carried out, in duplicate, with a carcinoma from each of two pure strains of mice.

The first was a carcinoma that had occurred spontaneously in strain A mouse 29,225. This tumor was transplanted into strain A mice and the tissue obtained from the first transplant tumors was employed in the titration summarized in table 4. It is seen that mere standing of the 1:10 preparation for one-half hour so reduced its potency that only 50 percent "takes" were obtained. Centrifuging for only 2 minutes, without dilution, rendered the suspension inactive.

TABLE 4.—*Tumors obtained in strain A mice with suspensions of carcinoma 29,225*

[Tumor history First transplant of a carcinoma which occurred spontaneously in a strain A mouse, gelatin concentration, 10 percent, amount injected, 0 2 cc, number of mice, 24]

Days after inoculation	Tumor size			
	Fragment implants	Dilution of suspension		
		1:10	1:10 A	1:10 B
19	0-2-0	0-0-0	0-0-0	0-0-0
	1-2-0	0-0-0	0-0-0	0-0-0
25	3-4-1	2-3-1	0-0-0	0-0-0
	2-4-0	1-1-2	0-0-0	0-0-0
32	3-5-1	3-3-2	2-0-0	0-0-0
	3-4-0	2-3-4	0-4-0	0-0-0
60	7-8-8	*-*-*	7-0-0	0-0-0
	8-9-0	*-*-*	0-*-7	0-0-0

A denotes preparation allowed to settle under gravity ½ hour.
B denotes preparation centrifuged for 2 minutes
The size of each tumor is designated by a number, from 1 to 9, corresponding to the average diameter; 0 denotes tumor absent, * denotes a very large tumor.

Essentially the same results were obtained on repetition of the experiment with the next generation of this same carcinoma, using a larger number of mice.

Carcinoma 62 (first and second transplants).—This carcinoma was a tumor which had arisen spontaneously in a strain D mouse. For the titration, the first transplant tumors were employed. The stock suspension was prepared and diluted in the usual way.

With this carcinoma, 100 percent "takes" were obtained with the centrifuged 1:10 suspension, although the tumors were slow in making their appearance. The 1:30 dilution produced two tumors in six cases, while the 1:90 dilution gave negative results.

Analogous results were obtained on repetition of the titration with the next generation of carcinoma 62. (See table 5.) Here, too, there was a progressive decrease in the percentage of tumors obtained, and a progressive increase in the latent period, with increasing dilution of the suspension.

TABLE 5.—*Tumors obtained in strain D mice with suspensions of carcinoma 62*

[Tumor history: Second transplant of a carcinoma that occurred spontaneously in a strain D mouse; gelatin concentration, 10 percent, amount injected, 0.1 cc; number of mice, 30]

Days after inoculation	Tumor size		
	Dilution of suspension		
	1:10 B	1:30 B	1:90 B
26	1-0-0-0-0 0-0-1-1-0	0-0-0-0-0 0-0-0-0-0	0-0-0-0-0 0-0-0-0-0
33	4-1-0-0-1 0-0-2-3-0	0-0-0-2-0 7-0-1-0-0	0-0-0-0-0 0-0-0-0-0
46	8-2-0-0-2 2-0-7-7-1	0-0-2-4-0 2-0-4-0-0	0-0-0-0-0 0-0-0-0-0
60	*-7-3-0-5 8-3-*-*-2	0-0-4-7-0 4-0-8-0-0	2-0-0-0-0 0-0-0-0-0

B denotes preparations centrifuged for 2 minutes.
The size of each tumor is designated by a number, from 1 to 9, corresponding to the "average diameter"; 0 denotes tumor absent; * denotes a very large tumor.

DISCUSSION

Analogous experiments with rat tumors have recently been carried out, independently, by Schrek (*2*), who stated: "In a quantitative study of tumor growth, it is necessary that the inoculum used should be easily and accurately measurable and should be of known potency. For this purpose, a homogeneous tumor cell suspension was prepared. The potency of this suspension was found by titration." The results obtained by Schrek in rat tumor titrations and those obtained in this laboratory in mouse tumor titrations are in general agreement as regards the following points: (1) With increasing dilution of the tumor suspensions, the percentage of "takes" decreased until finally no tumors were obtained; (2) the latent period was increased by in-

creasing the dilution; (3) duplicate titrations had about the same reproducibility in the rat tumor and in the mouse tumor titrations.

The chief differences in the two investigations were: (1) The rat tumor suspensions were prepared in physiological saline and were filtered by gravity through an 80-mesh sieve, whereas the mouse tumor suspensions were prepared in saline that contained 10 percent gelatin and were centrifuged to remove the large particles; (2) pure strain animals were employed in the mouse experiments; (3) tumors were used that had arisen in the same pure strains of mice that were employed in the titrations.

Schrek stated: "The minimal inoculating dose, used as a measure of the potency of the suspension, is defined, in accordance with the principles developed by Trevan's work on drugs and toxins * * *, as the volume of suspension which gave rise to tumors in 50 percent of the animals of a suitable strain, age, and weight." A similar concept was employed in the mouse tumor titrations in which "Intermediate dilutions were sought which gave rise to tumors in about 50 percent of the cases. With different tumors, this mid-point in the titration occurred at different dilutions" (*4*).

With the two rat tumors studied by Schrek, the titers of the suspensions of both tumors were roughly the same. With the mouse tumors, wide differences in the titers were noted. Emulsions of sarcoma 180, even in the 1:10 dilution, failed to give any tumors at all after centrifuging for a few minutes. When sarcomas were used that had arisen originally in pure-strain mice, tumors were obtained, even after centrifuging, with 1:100 dilution in the case of the strain A sarcoma and with 1:1,000 dilution in the case of the strain D sarcoma. This result is not unexpected; for, even though sarcoma 180 *tissue* gives 100 percent "takes," isolated *cells* of sarcoma 180 would not be so likely to establish themselves as successfully as isolated cells of sarcomas that were derived from tissues of other mice of the same pure strain.

The two carcinomas examined in this way gave considerably lower titers than did the two pure-strain sarcomas. Carcinoma 29,225 gave about the same results as sarcoma 180 in that the centrifuged suspensions gave negative results even in the 1:10 dilution. Carcinoma 62 gave a higher titer; tumors were obtained with centrifuged preparations in 1:10 and 1:30 dilution. However, this was a much lower titer than that obtained with the pure-strain sarcomas.

It would appear that carcinomas of the same pure strain, which give 100 percent "takes" when implanted as tissue or in a highly concentrated and uncentrifuged suspension, fail to give rise to tumors when only isolated cells or very small clumps of cells are implanted. This also is not unexpected, for the suspensious were injected *sub-*

cutaneously; in such an environment small numbers of sarcoma cells are more likely to establish themselves successfully than equally small numbers of carcinoma cells, even though the latter be of the same pure strain.

In the titrations reported by Schrek, the finely divided tumor tissue was diluted 1:10, 1:100, 1:333, and 1:1,000 and injected in doses of 0.1 cc. This is essentially the procedure employed in the mouse titrations. With the rat tumors, Schrek obtained about 34 percent "takes" with 1:100 dilution. With this same dilution the pure strain mouse sarcomas gave a much higher percentage of "takes", while the pure-strain mouse carcinomas gave no "takes." The actual concentrations of tumor material in suspensions of a stated dilution are, however, not comparable in the mouse and rat experiments inasmuch as the mouse suspensions were centrifuged before dilution.

Microscopic examination[4] of the centrifuged suspensions showed that the tumor material was present as single cells, as small clumps of cells, and as cellular debris. Attempts were made at cell counts, but these were soon abandoned, inasmuch as it was not found possible to differentiate living from dead cells. Other studies,[4] now in progress, may perhaps furnish criteria that will be helpful in such cell counts. Staining with neutral red has so far not been found reliable in distinguishing the living from the dead cells in such preparations.

The three major points brought out in this investigation are: *First*, that with sufficiently dilute suspensions no tumors are obtained, and that a point may be found in the titration at which tumors are obtained in about half of the mice; *second*, that the time required for the development of the tumors increases with the dilution of the suspension; and *third*, different tumors give widely different results in such titrations.

For chemotherapeutic studies, this technique has several advantages. In the first place the period available for treatment is lengthened appreciably by the use of dilute suspensions. In the second place, the tumors obtained do not vary so greatly among themselves in size and in growth rate as is often the case when other methods of transplanting are used. Finally, the possibility is opened for investigation as to whether agents which have no effect when a so-called "overwhelming dose" of tumor is given may be found to have a detectable effect at the dilution which gives rise to tumors in about half of the animals.

(Technical assistance was given by Mr. Adrien Perrault. This work was aided by personnel supplied by the Boston office of the Federal Emergency Relief Administration.)

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[4] In collaboration with Dr. Morris Belkin.

SUMMARY

1. Homogeneous tumor suspensions have been prepared by shaking minced tumor tissue in salt solutions containing gelatin.

2. Mouse tumors have been titrated by injecting into pure strain mice equal volumes of tumor suspensions of varying dilution.

3. With concentrated suspensions 100 percent "takes" were obtained, and with highly diluted ones no tumors were obtained. Dilutions may be found with which tumors may be obtained in approximately half of the mice.

4. When suspensions of tumors arising in pure-strain mice were injected subcutaneously into mice of the same pure strain, sarcomas gave rise to tumors at high dilutions, whereas carcinomas gave rise to tumors only at comparatively low dilutions.

5. Duplicate titrations gave results of satisfactory reproducibility.

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DEATHS DURING WEEK ENDED MAY 2, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 2, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,480	8,715
Deaths per 1,000 population, annual basis	13.2	12.1
Deaths under 1 year of age	582	537
Deaths under 1 year of age per 1,000 estimated live births	53	49
Deaths per 1,000 population, annual basis, first 18 weeks of year	13.6	12.6
Data from industrial insurance companies:		
Policies in force	68,511,026	67,870,719
Number of death claims	14,293	13,604
Death claims per 1,000 policies in force, annual rate	10.9	10.5
Death claims per 1,000 policies, first 18 weeks of year, annual rate	10.9	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended May 9, 1936, and May 11, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 9, 1936, and May 11, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935
New England States:								
Maine	1	1	3	1	134	160	0	0
New Hampshire	-	1	-	-	82	-	0	0
Vermont	1	1	-	-	545	39	0	0
Massachusetts	7	10	-	-	1,407	374	7	2
Rhode Island	-	-	-	-	76	319	3	1
Connecticut [1]	6	5	3	1	249	1,535	5	1
Middle Atlantic States:								
New York	73	35	[2] 8	[2] 10	3,892	3,027	25	19
New Jersey	9	27	14	7	567	2,037	8	2
Pennsylvania	21	44	-	-	1,114	3,543	9	7
East North Central States:								
Ohio	20	30	65	26	333	1,544	9	27
Indiana	6	13	40	17	23	376	10	3
Illinois	25	69	54	30	43	2,188	9	17
Michigan	5	7	5	-	113	5,459	3	5
Wisconsin	1	2	37	8	130	1,613	2	1
West North Central States:								
Minnesota	1	12	2	2	456	585	2	0
Iowa	7	8	31	2	3	445	3	3
Missouri	16	18	207	54	41	487	8	7
North Dakota	-	1	18	2	-	30	0	0
South Dakota	-	-	-	-	4	38	0	1
Nebraska	2	3	-	11	20	234	0	8
Kansas	10	14	48	4	22	1,034	2	2
South Atlantic States:								
Delaware	1	-	-	2	19	12	0	0
Maryland [3]	2	6	12	9	429	67	10	12
District of Columbia	16	8	1	1	187	-	1	11
Virginia	18	9	147	-	256	581	11	11
West Virginia	8	14	27	35	76	449	7	5
North Carolina [1]	19	7	28	2	43	200	8	2
South Carolina	6	4	142	80	76	29	4	1
Georgia [1]	4	10	-	-	-	-	2	2
Florida	3	6	8	1	29	50	4	1
East South Central States:								
Kentucky	9	9	101	10	27	506	9	6
Tennessee	6	12	160	28	29	112	7	4
Alabama [1]	13	13	123	51	16	164	1	1
Mississippi [3]	5	11	-	-	-	-	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 9, 1936, and May 11, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935
West South Central States:								
Arkansas	6	....	169	70	1	62	0	2
Louisiana	11	15	310	15	63	70	2	0
Oklahoma [4]	5	8	247	51	26	66	1	4
Texas	28	38	498	92	450	161	4	0
Mountain States:								
Montana [5]	6	....	2	16	....	364	1	2
Idaho	....	....	6	1	11	8	6	0
Wyoming [5]	2	1	....	....	2	124	0	0
Colorado	3	7	....	....	26	307	1	0
New Mexico	2	5	26	5	38	66	1	0
Arizona	1	2	35	10	116	11	1	2
Utah [3]	....	2	....	....	12	14	2	0
Pacific States:								
Washington	1	4	3	....	330	436	2	3
Oregon [5]	2	....	14	32	138	288	0	0
California	23	36	163	28	1,914	1,682	9	6
Total	411	528	2,757	714	13,568	30,896	193	177
First 19 weeks of year	10,570	12,527	132,745	98,748	181,394	521,529	4,515	2,664

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935
New England States:								
Maine	0	0	9	12	0	0	3	1
New Hampshire	0	0	13	7	0	0	1	0
Vermont	0	0	5	9	0	0	0	1
Massachusetts	2	0	246	191	0	0	1	8
Rhode Island	0	0	19	10	0	0	0	1
Connecticut [1]	0	0	40	108	0	0	2	0
Middle Atlantic States:								
New York	1	0	904	1,147	0	0	12	5
New Jersey	1	0	328	204	0	0	0	1
Pennsylvania	2	1	381	660	0	0	16	8
East North Central States:								
Ohio	0	0	288	664	0	0	4	5
Indiana	0	0	180	114	4	1	0	2
Illinois	0	0	575	1,287	18	4	6	6
Michigan	1	1	283	369	0	0	4	1
Wisconsin	1	2	546	431	6	10	0	1
West North Central States:								
Minnesota	1	0	314	367	7	9	2	1
Iowa	0	1	203	83	62	6	4	1
Missouri	0	0	205	60	1	1	1	5
North Dakota	0	0	63	56	8	1	0	0
South Dakota	0	0	16	11	19	9	0	0
Nebraska	0	1	101	80	21	28	0	0
Kansas	0	0	296	56	38	22	1	3
South Atlantic States:								
Delaware	0	0	3	6	0	0	0	0
Maryland [3]	0	0	46	54	0	0	2	5
District of Columbia	0	0	17	64	0	0	1	0
Virginia	1	3	49	26	0	0	0	6
West Virginia	0	0	32	63	0	0	4	9
North Carolina [1]	2	0	23	8	0	1	3	3
South Carolina	0	0	4	3	0	0	3	5
Georgia [1]	0	0	7	12	0	0	9	9
Florida	0	1	7	3	0	0	5	1
East South Central States:								
Kentucky	0	0	23	38	1	0	4	6
Tennessee	0	0	20	21	0	1	3	6
Alabama [1]	0	1	6	7	0	1	3	4
Mississippi [3]	0	0	6	4	0	0	2	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 9, 1936, and May 11, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935	Week ended May 9, 1936	Week ended May 11, 1935
West South Central States:								
Arkansas	0	2	8	6	0	0	1	2
Louisiana	0	2	3	10	1	0	5	14
Oklahoma [4]	0	4	36	14	0	2	2	5
Texas	3	1	65	28	2	3	8	7
Mountain States:								
Montana [5]	1	0	66	7	11	9	0	0
Idaho	1	0	23	3	3	0	0	1
Wyoming [5]	0	0	77	10	24	7	0	0
Colorado	0	0	87	149	24	8	0	0
New Mexico	0	0	52	13	0	2	1	2
Arizona	1	0	23	41	0	0	0	0
Utah [3]	0	0	41	91	4	0	0	0
Pacific States:								
Washington	0	2	73	61	9	25	3	3
Oregon [5]	0	0	21	57	8	3	5	1
California	4	7	271	218	1	18	13	4
Total	22	29	6,104	6,943	272	166	129	146
First 19 weeks of year	338	459	144,638	136,417	4,396	3,623	2,145	2,540

[1] Typhus fever, week ended May 9, 1936, 6 cases, as follows: Connecticut, 1; North Carolina, 1; Georgia, 2; Alabama, 2.
[2] New York City only.
[3] Week ended earlier than Saturday.
[4] Exclusive of Oklahoma City and Tulsa.
[5] Rocky Mountain spotted fever, week ended May 9, 1936, 15 cases, as follows: Montana, 6; Wyoming, 5; Oregon, 4.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April 1936										
Connecticut	7	9	35	1	423		0	272	0	9
District of Columbia	20	62	5		404	1	0	81	0	3
Iowa	10	18	38		18		0	1,000	169	1
North Carolina	22	70	183		223	48	4	82	3	7
Pennsylvania	41	138		2	4,110		4	2,297	0	40
Wyoming	1	2			16		0	242	27	0

April 1936

	Cases
Anthrax:	
Pennsylvania	1
Chickenpox:	
Connecticut	396
District of Columbia	60
Iowa	233
North Carolina	322
Pennsylvania	2,384
Wyoming	39
Conjunctivitis:	
Connecticut	18
Dysentery:	
Connecticut (bacillary)	1
Epidemic encephalitis:	
Connecticut	1
Iowa	1
Pennsylvania	4
German measles:	
Connecticut	1,675
Iowa	5
North Carolina	713
Pennsylvania	1,901
Leprosy:	
Pennsylvania	1
Mumps:	
Connecticut	385
Iowa	637
Pennsylvania	3,111
Wyoming	114
Ophthalmia neonatorum:	
North Carolina	1
Pennsylvania	2
Paratyphoid fever:	
Connecticut	2
Rabies in man:	
Pennsylvania	2
Rocky Mountain spotted fever:	
North Carolina	1
Wyoming	4
Septic sore throat:	
Connecticut	26
Iowa	1
Septic sore throat—Contd.	
North Carolina	1
Wyoming	5
Tetanus:	
Connecticut	1
Tularaemia:	
North Carolina	1
Typhus fever:	
North Carolina	1
Undulant fever:	
Connecticut	6
Iowa	8
Pennsylvania	5
Whooping cough:	
Connecticut	563
District of Columbia	94
Iowa	56
North Carolina	129
Pennsylvania	1,140
Wyoming	11

WEEKLY REPORTS FROM CITIES

City reports for week ended May 2, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet-fever cases	Smallpox cases	Tuberculosis deaths	Typhoid-fever cases	Whooping-cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	6	28	3	4	0	0	0	4	26
New Hampshire:											
Concord	0	------	0	0	0	0	0	1	0	0	10
Manchester	0	------	0	0	4	3	0	2	0	0	12
Nashua	0	------	------	25	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	114	0	0	0	0	0	2	10
Rutland	0	------	1	55	0	1	0	0	0	0	6
Massachusetts:											
Boston	2	------	0	470	33	69	0	7	0	23	275
Fall River	1	------	0	4	1	22	0	1	0	0	33
Springfield	0	------	0	1	2	10	0	2	0	8	47
Worcester	0	------	0	77	5	9	0	2	0	16	61
Rhode Island:											
Pawtucket	0	------	0	0	0	2	0	0	0	0	14
Providence	0	------	0	21	3	15	0	4	0	5	77
Connecticut:											
Bridgeport	1	------	1	11	1	1	0	2	0	0	38
Hartford	1	------	0	0	7	10	0	0	0	4	61
New Haven	0	------	2	0	4	1	0	1	0	34	64
New York:											
Buffalo	0	------	0	50	18	45	0	9	0	6	177
New York	41	------	8	1,831	142	456	0	74	5	61	1,561
Rochester	0	------	0	2	5	6	0	0	1	0	80
Syracuse	0	------	0	98	2	11	0	2	0	24	56
New Jersey:											
Camden	0	2	2	6	1	5	0	1	0	0	35
Newark	0	6	1	15	15	156	0	5	2	14	124
Trenton	0	------	0	2	3	9	0	2	0	9	35
Pennsylvania:											
Philadelphia	2	4	3	609	46	84	0	34	1	77	491
Pittsburgh	6	5	4	20	41	92	0	13	2	16	214
Reading	0	------	0	2	1	11	0	2	0	1	38
Scranton	0	------	------	0	------	1	0	------	0	0	------
Ohio:											
Cincinnati	1	------	2	19	19	34	0	13	0	0	154
Cleveland	3	26	0	87	26	93	0	15	0	74	225
Columbus	0	1	1	2	12	1	0	2	0	1	106
Toledo	0	2	2	29	7	3	0	6	0	29	89
Indiana:											
Anderson	0	------	0	------	2	15	0	0	0	4	18
Fort Wayne	0	------	0	0	4	10	0	1	0	0	37
Indianapolis	1	------	0	6	25	65	0	9	0	5	128
Muncie	0	------	1	0	2	1	0	1	0	0	18
South Bend	0	------	0	0	2	1	0	0	0	22	16
Terre Haute	0	------	0	0	7	0	0	0	0	0	28
Illinois:											
Alton	0	------	0	0	1	3	0	0	0	1	8
Chicago	7	8	2	17	74	194	0	48	0	96	878
Elgin	0	------	0	0	1	5	0	0	0	0	14
Moline	0	------	0	0	3	9	0	0	0	0	10
Springfield	0	------	0	0	4	9	0	0	0	0	30
Michigan:											
Detroit	5	5	4	38	29	144	1	14	0	247	290
Flint	0	------	0	2	8	10	0	1	0	14	34
Grand Rapids	0	------	0	10	1	9	0	0	0	4	32
Wisconsin:											
Kenosha	0	2	0	0	0	11	0	0	0	0	6
Madison	0	------	0	2	4	10	0	1	0	6	24
Milwaukee	0	1	1	5	13	81	0	4	0	110	125
Racine	0	------	0	2	1	16	0	0	0	3	15
Superior	0	------	0	1	0	26	0	0	0	0	12
Minnesota:											
Duluth	0	------	0	7	2	15	0	1	0	16	22
Minneapolis	2	------	0	260	8	90	0	1	0	8	124
St. Paul	0	1	1	201	9	33	0	1	0	2	67
Iowa:											
Cedar Rapids	0	------	------	0	------	3	0	------	0	4	------
Davenport	0	------	------	0	------	9	0	------	0	0	------
Des Moines	0	------	------	1	------	5	1	------	0	0	37
Sioux City	1	------	------	0	------	23	30	------	0	0	------
Waterloo	0	------	------	1	------	5	0	------	0	0	------

City reports for week ended May 2, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Missouri:											
Kansas City	1	1	0	0	9	107	0	3	0	2	112
St. Joseph											
St. Louis	3		3	7	21	77	0	13	0	13	204
North Dakota:											
Fargo	0		0	1	1	2	0	1	1	0	16
Grand Forks	0			1		0	0		0	0	
Minot	0		0	0	0	8	0	0	0	0	5
South Dakota:											
Aberdeen	0			0		9	0		0	0	
Nebraska:											
Omaha	2		0	4	10	59	4	4	0	4	73
Kansas:											
Lawrence	0	1	0	1	0	10	0	0	0	0	8
Topeka	0		0	2	11	60	0	0	0	1	41
Wichita	1	1	1	2	12	46	1	0	0	0	30
Delaware:											
Wilmington	0		0	2	2	1	0	1	0	14	24
Maryland:											
Baltimore	5	4	0	235	25	83	0	11	0	56	231
Cumberland	1		0	0	2	1	0	1	0	0	12
Frederick	0		0	1	0	0	0	0	0	0	4
District of Col.:											
Washington	7	3	2	126	23	23	0	14	1	26	182
Virginia:											
Lynchburg	2		0	1	1	1	0	0	0	9	14
Norfolk	0		0	1	4	2	0	1	0	0	32
Richmond	0		2	1	7	37	0	2	0	0	62
Roanoke	0		0	0	2	1	0	0	0	0	23
West Virginia:											
Charleston	0	2	0	2	1	1	0	0	1	0	8
Huntington	0			9		4	0		0	0	
Wheeling	0		0	65	1	0	0	2	0	3	18
North Carolina:											
Gastonia	0		0	0	0	0	0	0	0	0	
Raleigh											
Wilmington	0		0	0	3	0	0	0	0	0	13
Winston-Salem	0	2	0	34	2	2	0	0	1	0	13
South Carolina:											
Charleston	0	9		1	5	1	0	0	1	9	17
Columbia											
Florence	0		0	0	3	0	0	0	0	0	12
Greenville	0		0	8	0	0	0	0	0	0	
Georgia:											
Atlanta	1	8	3	1	12	9	0	4	1	0	89
Brunswick	0		0	0	2	0	0	0	0	0	4
Savannah	0	22	1	0	2	0	0	2	0	1	41
Florida:											
Miami	0	8	3	2	2	2	0	1	0	0	39
Tampa	0	2	2	11	0	4	0	1	0	0	29
Kentucky:											
Ashland	0		4	0	2	0	0	0	0	0	18
Covington	0		0	1	1	3	0	1	0	0	12
Lexington	0	10	0	12	3	2	0	2	0	2	22
Louisville	0	2	1	32	13	11	0	6	0	4	96
Tennessee:											
Knoxville	0	3	3	9	3	1	0	3	0	0	38
Memphis	1		3	0	10	6	0	3	0	21	81
Nashville	1		3	2	14	2	0	1	1	0	70
Alabama:											
Birmingham	0	8	4	0	6	0	0	7	1	0	62
Mobile	1	1	1	1	2	0	0	1	0	0	21
Montgomery	0			1		0	0		0	0	
Arkansas:											
Fort Smith	0			0		0	0		0	0	
Little Rock	2		0	0	6	1	0	2	1	0	9
Louisiana:											
Lake Charles	0		0	0	2	1	0	0	0	0	3
New Orleans	5	19	10	8	22	9	0	10	4	65	192
Shreveport	0		0	35	12	1	0	1	0	1	51
Oklahoma:											
Oklahoma City	1	30	2	0	6	0	0	4	0	0	70
Tulsa	0			3		3	0		0	0	
Texas:											
Dallas	0	7	7	32	8	10	0	2	0	6	72
Fort Worth	0		0	2	2	3	0	0	0	0	30
Galveston	0		0	2	4	0	0	1	0	0	19
Houston	2		4	36	14	5	0	6	0	1	79
San Antonio	2		2	7	10	1	0	8	0	0	85

City reports for week ended May 9, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet-fever cases	Smallpox cases	Tuberculosis deaths	Typhoid-fever cases	Whooping-cough cases	Deaths, all causes
Montana:											
Billings	0	------	0	0	2	4	0	0	0	0	11
Great Falls	0	------	0	1	0	3	0	0	0	1	11
Helena	0	------	0	0	0	4	1	0	0	0	4
Missoula	0	------	0	0	0	1	0	0	0	0	1
Idaho:											
Boise	0	------	0	4	0	1	0	0	0	0	5
Colorado:											
Colorado Springs	0	------	0	1	2	6	0	0	0	2	14
Denver	2	------	0	23	10	17	1	7	0	26	84
Pueblo	0	------	0	1	3	15	0	0	0	1	10
New Mexico.											
Albuquerque	1	------	0	6	3	6	0	3	0	2	9
Utah:											
Salt Lake City	0	------	0	33	2	38	1	1	0	3	40
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	1	------	------	225	3	6	2	3	0	12	68
Spokane	0	------	0	15	1	30	1	0	0	16	27
Tacoma	0	------	0	20	5	2	0	0	0	3	22
Oregon											
Portland	0	2	2	31	5	5	0	2	0	1	74
Salem	0	6	------	8	------	0	0	------	0	0	------
California:											
Los Angeles	16	22	0	460	25	61	0	14	0	41	202
Sacramento	0	1	0	6	2	5	0	4	1	8	40
San Francisco	0	------	0	199	11	67	0	5	0	26	178

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:			
Boston	3	1	1
Rhode Island:			
Providence	1	1	0
New York:			
New York	14	6	2
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	4	0	0
Pittsburgh	2	1	0
Reading	2	0	0
Ohio:			
Cincinnati	5	1	0
Cleveland	1	1	0
Columbus	0	1	0
Toledo	1	0	0
Indiana:			
Indianapolis	2	0	0
Illinois:			
Chicago	8	3	0
Michigan:			
Detroit	3	2	1
Wisconsin:			
Madison	0	0	1
Minnesota:			
Minneapolis	2	2	0
St. Paul	1	0	0
Iowa:			
Davenport	1	1	0
North Dakota:			
Grand Forks	1	1	0
Kansas:			
Topeka	0	1	0
Maryland:			
Baltimore	10	6	0

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
District of Columbia:			
Washington	8	1	0
Virginia:			
Lynchburg	2	1	0
Richmond	1	0	0
West Virginia:			
Huntington	1	0	0
North Carolina:			
Wilmington	1	0	0
South Carolina:			
Charleston	3	1	0
Georgia:			
Atlanta	2	0	0
Kentucky:			
Lexington	1	1	0
Louisville	1	1	0
Tennessee:			
Nashville	1	0	0
Louisiana:			
New Orleans	7	2	0
Shreveport	0	2	0
Oklahoma:			
Oklahoma City	2	1	0
Texas:			
Dallas	1	1	0
Fort Worth	0	0	1
Galveston	0	1	0
Houston	1	1	0
Utah:			
Salt Lake City	1	0	0
Washington:			
Spokane	1	0	0
California:			
Los Angeles	3	0	0
San Francisco	1	0	0

Dengue.—Cases: Charleston, S. C., 1.
Epidemic encephalitis.—Cases: Worcester, 1; Toledo, 1.
Pellagra.—Cases: Winston-Salem, 4; Charleston, S. C., 2; Savannah, 6; Miami, 1; San Francisco, 1.
Typhus fever.—Cases: Wilmington, N. C., 1; Fort Worth, 1.

FOREIGN AND INSULAR

HAWAII TERRITORY

Honolulu—Rat leprosy.—Under date of April 16, 1936, it was reported that a wild rat trapped in the city of Honolulu, Hawaii Territory, on April 9, 1936, had been found infected with rat leprosy.

SWITZERLAND

Communicable diseases—January—March 1936.—During the months of January, February, and March 1936, cases of certain communicable diseases were reported in Switzerland as follows:

Disease	January	February	March	Disease	January	February	March
Cerebrospinal meningitis	3	1	2	Paratyphoid fever			2
Chicken pox	316	246	248	Poliomyelitis	11	4	8
Diphtheria and croup	221	120	98	Scarlet fever	302	279	228
German measles			11	Tuberculosis	314	343	319
Lethargic encephalitis		1	3	Typhoid fever	1	3	4
Measles	122	104	102	Undulant fever			4
Mumps	250	221	169	Whooping cough	124	136	161

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for April 24, 1936, pages 522–534. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued May 29, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India—Chittagong.—During the week ended May 2, 1936, 4 cases of cholera with 1 death were reported at Chittagong, India.

Plague

Argentina—San Luis Province.—For the period April 16–30, 1936, 6 cases of pneumonic plague with 6 deaths were reported at Medanos and Los Medanitos, San Luis Province, Argentina.

Ceylon—Kalutara—Correction.—The case of bubonic plague in Kalutara, Ceylon, reported in PUBLIC HEALTH REPORTS for May 15, 1936, page 642, was stated in a later report not to be plague.

Ceylon—Manar.—On April 17, 1936, 1 case of bubonic plague was reported at Manar, Ceylon.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—Two rats found April 27, 1936, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague-infected.

Smallpox

Argentina—Buenos Aires Province—Ayacucho.—During the period April 16–30, 1936, 1 case of smallpox with 1 death was reported at Ayacucho, Buenos Aires Province, Argentina.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen R C WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 39; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

Requests for and communications regarding the PUBLIC HEALTH REPORTS, reprints, or supplements should be addressed to the Surgeon General, United States Public Health Service, Washington, D. C. Subscribers should remit direct to the Superintendent of Documents, Washington, D. C.

Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

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THE PREPARATION OF A CONCENTRATE OF VITAMINS B_1 AND B_2 FROM BREWERS' YEAST

By MAURICE I. SMITH and ATHERTON SEIDELL, *Division of Pharmacology, National Institute of Health, United States Public Health Service*

In the course of concentration and isolation of the antineuritic vitamin B_1 as described in previous publications (1, 2), the thermostable growth factor B_2 is gradually eliminated. It became a matter of interest to ascertain at what stage of the process the bulk of the latter vitamin is eliminated. Physiological tests of the B_2 potency of the various fractions usually discarded in the process of isolation of B_1 from brewers' yeast showed that the greater part of B_2 was eliminated in the precipitate obtained during the concentration by distillation of the extract derived by eluting the water-soluble vitamins from fuller's earth adsorbate. A considerable amount of B_1 also was found to separate out at this stage. More recently a method has been found for the further concentration of the vitamins in this precipitate, with the result that concentrates have now been obtained of a high order of potency as compared with dried brewers' yeast. Such concentrates have been found especially useful in nutritional investigations requiring rigorous control of the nitrogenous constituents of experimental "synthetic" diets In the belief that such concentrates may be of some service to other workers in nutrition, their preparation and properties are described in this report.

Fresh pressed brewers' bottom yeast is partially liquefied by the addition of about 20 percent of its weight of sodium chloride, and to this mixture an approximately equal volume of 95 percent ethyl alcohol is added. The suspended solids in this mixture are removed, preferably by means of a filter press; and to the clear alcoholic extract, English fuller's earth is added in proportion of 5 kilograms for each 100 kilograms of fresh yeast employed. The mixture is stirred continuously for at least half an hour, and the adsorbate is separated and washed. The vitamins are extracted from the adsorbate by suspending it in water in proportion of 10 liters per kilogram of adsorbate, adding sufficient concentrated sodium hydroxide to render the solution about 0.4 normal, agitating the mixture violently for 3 minutes and removing the adsorbate by centrifugation as quickly as possible, and then acidifying the clear solution with sulphuric acid to pH 4.5. A precipitate forms at this point, which is separated and

discarded. The aqueous solution is concentrated by vacuum distillation to about one-tenth its volume or less.[1] During this distillation a large amount of brown precipitate is formed, representing the greater part of the B_2 of the original extract and a considerable amount of its B_1. This precipitate is immediately separated by centrifugation, and may be washed by stirring with 2 or 3 times its volume of water and again centrifuging. The washed precipitate is dried in vacuum.

The yield of such precipitates, which may be referred to as the crude concentrate, appears to vary with the degree of concentration of the liquid; and since it is difficult to regulate this quantitatively, amounts varying from 100 to 400 grams per 100 kilograms of fresh yeast have been obtained. The physiological activity of such crude concentrates will be discussed below.

Extended experiments, with the object of effecting a further concentration of the vitamins, have shown that alkaline methyl alcohol removes the vitamins almost quantitatively, leaving the greater part of the inert material behind. The best solvent appears to be methyl alcohol containing 10 percent of its volume of aqueous 2 normal sodium hydroxide solution. Thus, 100 grams of the crude concentrate may be most conveniently extracted by grinding in a mortar with 200 cc of the alkaline methyl alcohol, centrifuging, and decanting the clear supernatant solution. This extraction should be repeated with 150, 125, and 100 cc of solvent, and finally twice with 100 cc methyl alcohol each. Each of the extracts is acidified to methyl red with normal sulphuric acid, and the final mixture is brought to pH 4.0. A precipitate separating out at this point is removed by centrifugation and may be discarded. The clear alcoholic solution is evaporated to dryness in a current of warm air. The deposit is transferred to a centrifuge tube of convenient size with the aid of ethyl ether, is thoroughly extracted with this solvent, and is finally dried in vacuum. The weight of such concentrates is usually about 10 percent of the crude concentrate referred to above.

THE PHYSIOLOGICAL POTENCY OF THE CONCENTRATES

The activity of the concentrates for B_1 and B_2 was determined by methods previously described. The tests for B_1 are based on the determination of the minimum amount of concentrate required to bring about a remission in polyneuritic rats (3). The International Standard for B_1 was used as a standard of reference, and the B_1 potency of our concentrates is expressed in terms of International B_1 units, bearing in mind that the International Unit is the equivalent of 10 mg of the International Standard. The B_2 activity of the concentrates was measured in terms of weight increment per day when

[1] Unless it is desired to continue the concentration and purification of the antineuritic vitamin apart from B_2, the distillation may be continued to as small a volume as is convenient.

fed for a period of 10 days to rats on a basal diet adequately supplemented with intravenous injections of the crystalline antineuritic vitamin (4). The B_2 activity of the concentrates is expressed in terms of an arbitrary standard consisting of a carefully dried preparation of fresh bottom brewer's yeast secured in a local brewery, ground fine, and ether-extracted in a Soxhlet apparatus. Such a preparation, when kept thoroughly dry, has given no evidence of deterioration over a period in excess of 1 year. Since 200 mg of such a preparation produces a supraminimal increment of weight of about 1.5 gm per day when fed over a period of 10 days, we may define this as the B_2 unit as used herein, and thus our arbitrary standard has a potency of 5 units per gram.

The accompanying table summarizes the results obtained in a series of assays of the International Standard, crystalline B_1, several samples of dried brewer's yeast, and several concentrates. Examination of this table reveals the following:

1. The International Standard for B_1 is not wholly free from B_2, though it is only about one-third as active as dried brewer's yeast, weight for weight.

2. Dried brewer's yeast appears to present but little variation in B_2 activity, but may vary by as much as 800 percent in B_1 potency.

TABLE 1.—*The physiological B_1 and B_2 activity of several yeast preparations and concentrates*

No.	Description	B_1		B_2 units per gram
		Minimum curative dose	International Units per gram	
		Mg		
1	International Standard for B_1	20	100	<2
2	Dried brewers' yeast, laboratory sample	50	40	5
3	Dried brewers' yeast, commercial sample ("Medicinal Yeast A-B")	400	5	5
4	Dried brewers' yeast, commercial sample ("Vita Food" for medicinal use)	100	20	6
5	Dried brewers' yeast, 135-Y (provisional subsidiary B_1 standard, U. S P. Vitamin Committee)	300	6.6	6
6	Crude B_1B_2 concentrate 355D	5	400	30
7	Crude B_1B_2 concentrate 390	5	400	60
8	B_1B_2 concentrate 36 78	1	2,000	350
9	B_1B_2 concentrate 36 93	1	2,000	325
10	B_1B_2 concentrate 36 112	0.8	2,500	750
11	B_1B_2 concentrate 36 119	0.8	2,500	875
12	Crystalline B_1 vitamin hydrochloride (Merck)	0.006	333,000	0

3. Concentrates prepared by the method described herein may have a B_2 potency of from 70 to 175 times, and a B_1 potency of from 60 to 500 times that of dried brewers' yeast.

The precise relationship between the thermostable growth factor B_2 and the pellagra-preventive factor has never been definitely established, although they are usually referred to in the literature as one and the same thing. In view of their close association it is possible

that our concentrates may have an antipellagric potency parallel with their B_2 activity as measured by their growth effects on rats. We have found, in a series of experiments with experimental dermatitis produced in rats on a basal diet devoid of the B complex and supplemented with the crystalline antineuritic vitamin, that a minimum daily supplement of 200 to 300 milligrams of dried brewers' yeast (sample 2, table 1) is required to cure this condition in 10 to 20 days. In like manner, we have observed prompt disappearance of the lesions following the administration of several concentrates in doses of such magnitude as to indicate a close parallelism of their antidermatitic activity with their growth-promoting effects. As a striking illustration may be cited the instance of complete disappearance of skin lesions in a rat in 6 days following a single intravenous injection of 10 milligrams of a concentrate which had assayed 500 B_2 units per gram. A therapeutic test of such concentrates in clinical pellagra would seem to be well worth trying.

Through the courtesy of Dr. E. Elvove, of the National Institute of Health, nitrogen determinations were made on 2 of our concentrates, numbers 10 and 11, table 1, showing 11.76 and 10.92 percent, respectively. The nitrogen content of dried brewers' yeast, number 2, table 1, was 10.08 percent.

References

(1) Seidell and Smith: Pub. Health Rep., 45: 3194 (1930).
(2) ————: Jour. Am. Chem. Soc., 55: 3380 (1933).
(3) Smith: Pub. Health Rep., 45: 116 (1930).
(4) ————: Jour. Biol. Chem., 100: 225 (1933).

APPLICATION OF THE PRELIMINARY SANITARY SURVEY TO FLOODED AREAS

By J. M. DallaValle, *Passed Assistant Sanitary Engineer*, and J. J. Bloomfield, *Sanitary Engineer, United States Public Health Service*

During the past few years this country has been visited by several disasters, such as floods, tornadoes, and dust storms. As a result of these occurrences, the actual work of disaster relief has been placed on a firm foundation, so that such considerations as rescue work, food and clothing distribution, and temporary housing have been handled in a well-organized manner. In view of this fact, the sanitarian's duties have been confined mainly to the important considerations of a safe supply of water and milk, and of sewage disposal. Once these problems have been solved, the sanitarian is confronted with the task of determining the extent of the damage to various sanitary facilities.

In the recent floods experienced in the East, the authors, detailed to one of the flooded areas, were requested to aid the State health

department officials in determining the extent of the damage done to a relatively small area in the flooded zone. This information was needed in order to have accurate data for both rehabilitation purposes and for the determination of any illnesses which might have been caused by the flood.

The purpose of the present paper is to present the technique used in the organization and conduct of a preliminary sanitary survey, and to discuss the value of such a study.

METHODS USED IN THE PRESENT STUDY

In order to obtain uniform data, it was essential to devise a simple survey form which could be used in a house-to-house canvass. The form used in the present investigation is here reproduced. It will be observed from a study of this form that the data have been considered under four main headings.

The first heading, "General Data", relates to information as to number of occupants in the flooded home, whether or not they are on relief, and the location and type of construction of the dwelling.

The second heading, "Sanitary Data", was designed for the purpose of determining the condition of the water supply, the sewage disposal systems, the height that the water reached in the dwelling, the present level of the water, and certain information on the occupants' plans for cleaning their homes. This house-to-house survey provided an opportunity for instructing the householder in the correct way to clean the home and its environs, the mode of using disinfectant, and where this substance could be obtained in the locality free of charge.

The third subject covered by this survey concerned information of a medical and epidemiological nature. The surveyors were instructed to inquire about any illness existent in the home, and to record illnesses which had occurred since the flood. It will be seen that those illnesses which are at times associated with disasters have been especially noted on this form. However, the investigators were also instructed to record, in the margin, any other sickness not specifically mentioned. It was thought advisable, in the event of an epidemic, to obtain information as to the number of persons who had moved during the flood, where they moved to, and the date of return to their own homes. It is apparent that such information is of value to the medical authorities, since it is then possible to determine the number of persons who have been exposed to disease, and also the actual location of the exposed persons. The last subject covered by this survey dealt with physical damage to the structure itself, its contents, and such items as light, gas, and telephone service.

PRELIMINARY SANITARY SURVEY OF FLOODED AREAS

1. GENERAL DATA: SHEET NO.......... DATE..
Tenant's name.............................. Street..
Borough
Number occupants........ Working........ Relief........ Township..............................
Owner's name.............................. Address..
Type of dwelling. Detached........ Apartment........ Number stories........ Brick........
Frame........ Garage........ Stable........

2. SANITARY DATA:
A. Water. Public........ Private........ Condition of..
B. Sewers Public........ Privy........ Cesspool........ Septic tank........
Condition of..
C. Flood limit Cellar........ First story........ Second story........
D. Present level Cellar........ First story........
E Occupant's plans for clean-up..
F. Instructions furnished on clean-up..
G. Date when cellar pumped out.................... Was disinfectant used....................

3. MEDICAL DATA:
Sickness in family........................ Age.......... Date of onset........................
Diarrhea...... Typhoid...... Diphtheria...... Scarlet fever...... Measles......
Physician on case.................. .... Name of family physician........................
Did occupant move........ Address moved to..
Date returned..................

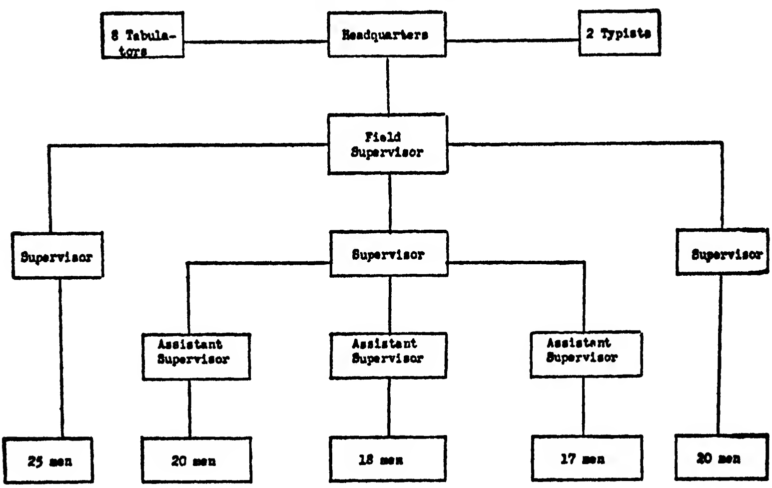
4. REHABILITATION DATA:
Estimate of damage. Cellar walls..
Floors................ Walls................ Furniture..
State general condition of structure..
Utilities Light.......... Gas.......... Telephone..........
Surveyed by.................... .... Checked by..

Owing to the fact that it was highly essential to obtain this information in a brief period of time, it was decided to use the facilities of the local W. P. A. Fortunately, this organization had trained "white-collar" workers who were at the time engaged on a house-to-house survey of another nature, and 100 of them were assigned to the present study. The accompanying chart gives a picture of the organization devised for the conduct of this study. The supervisors listed were called in as soon as the form was developed, and the purpose of the study as well as the various items in the form were discussed with them. It will be noted that almost all of the items in the form required merely a "yes" or "no" answer. These supervisors were furnished with maps of the area to be surveyed, headquarters were established in the various areas, and transportation was furnished for both supervisors and surveyors. The men who were to make the house-to-house survey were then assembled and the details of the study were explained to them. The data were recorded in triplicate so that one copy could be furnished to the city or town officials, one to the Red Cross, and one kept in the district health department headquarters for the use of the physicians and engineers. Considerable publicity was given to this project through the newspapers and radio, so that excellent cooperation was assured on the part of the householders.

With the aid of a skilled draftsman, also furnished by the W. P. A., it was possible to evolve master tabulation sheets for recording the

data obtained for each day. In addition to the men engaged on field work, the W. P. A. furnished 10 girls to do tabulating and typing. Eight of these girls were trained to work in teams of two in tabulating the data; one read the essential information while the other tallied. They were instructed to set aside the form for special disposition if any illness had been recorded or damage to sanitary facilities or to the dwelling itself. A medical case was starred with a black crayon, a sanitary case was labelled with a blue crayon, while a dwelling in need of immediate repair to the structure itself was marked with a red crayon. These marked forms were collected by two typists who immediately made a separate list of the medical, sanitary, and rehabilitation cases. In this way immediate attention could be given to those families in need of assistance of one kind or another. The

ORGANIZATION CHART



medical officer was kept informed by this technique as to the kind of sickness prevalent in his area, and the number of persons involved. The sanitary engineer knew which water or sewer facilities were damaged and also obtained some idea of the number of places needing disinfectant. The Red Cross and the town or city officials were apprised of the families requiring immediate aid.

RESULTS OF THE STUDY

The accompanying table presents a summary compilation of the entire survey. It was possible to complete the survey, as shown in the table, within the period of a week. Although the purpose of the present contribution is merely to point out the methods used in conducting such a preliminary survey, and to indicate its value from a standpoint of obtaining accurate information relating to public health

in a flooded area, it may be well to discuss very briefly the results which the present study yielded.

Preliminary survey of flooded areas

COMPILATION SHEET

Items of survey	Affected communities										
	A	B	C	D	E	F	G	H	I	J	Total
General data:											
Number of houses surveyed	3,158	752	209	16	811	154	118	53	302	66	5,639
Number of persons affected	13,696	3,446	913	79	4,167	634	678	291	1,433	351	25,688
Number on relief	903	658	199	5	659	45	112	33	113	55	2,782
Number of owner occupants	1,377	256	120	13	387	43	35	17	111	43	2,440
Sanitary data:											
Number of water supplies affected	50	5	33	13	18	0	11	0	0	0	130
Public	48	5	4	0	18	0	7	0	0	0	82
Private	2	0	29	13	0	0	4	0	0	0	48
Number of affected disposal systems	79	57	64	11	36	2	15	9	14	3	290
Public	72	17	0	0	16	2	5	0	10	0	122
Privy	5	37	34	4	5	0	9	9	0	2	105
Cesspool	2	3	29	4	15	0	1	0	4	1	59
Septic tanks	0	0	1	3	0	0	0	0	0	0	4
Flood limit:											
Cellar	1,782	326	35	1	394	145	117	20	121	62	2,703
First story	1,658	421	161	15	415	9	1	33	181	4	2,898
Second story	18	5	13	0	2	0	0	0	0	0	38
Present level:											
Cellar	1,340	197	44	2	105	0	97	2	66	12	1,865
First story	4	1	0	0	0	0	1	0	0	0	6
Number doing own cleaning	2,674	663	167	16	758	154	87	52	[illegible]	63	4,921
Number requiring aid	370	73	48	0	50	0	31	1	28	3	586
Number who have pumped cellars	2,003	607	159	14	714	154	20	51	236	55	3,904
Number needing disinfectant	2,530	650	134	9	330	70	100	17	210	42	4,082
Medical data:											
Number persons ill with—											
Diarrhea	8	1	0	0	0	0	0	0	0	0	9
Typhoid	0	0	0	0	0	0	0	0	0	0	0
Diphtheria	1	0	0	0	0	0	0	0	0	0	1
Scarlet fever	0	1	0	0	1	0	0	0	0	0	2
Measles	0	0	0	0	0	0	0	0	0	0	0
Other	207	25	29	0	61	8	7	3	8	1	344
Number of occupants who moved	7,350	1,894	734	75	2,520	121	0	161	883	119	13,856
Rehabilitation data:											
Number houses with damaged—											
Cellar walls	655	86	57	7	163	12	6	15	49	12	1,062
House walls	788	217	48	6	170	5	0	26	113	2	1,375
Floors	807	193	41	4	183	11	1	21	91	4	1,356
Furniture	968	221	45	9	193	6	0	21	133	3	1,599
Number houses in following condition:											
Good	2,453	639	133	9	726	151	109	32	268	63	4,583
Fair	551	90	49	4	58	3	8	13	27	2	805
Bad	154	23	27	3	27	0	1	8	7	1	251

It will be seen that this study covered nearly 6,000 homes, with a population of approximately 26,000. About 11 percent of the persons affected were on relief, and 43 percent of the homes were owned by their occupants. In all, 130 water supplies were affected. The public supplies affected, 82 in number, were found to be safe from a health standpoint, although the owners stated that the water was turbid, thereby giving the impression that it was unsafe. The 48 private supplies affected were given attention by the district engineers. The information on the number of affected sewage disposal systems was of considerable value to the engineers, and the data on privies were

immediately submitted to the State W. P. A. Administrator on the privy-construction project. It will also be observed from the information gathered under the heading of "Sanitary data" that the flood waters reached the first story in 51 percent of the cases, and at the time the survey was in progress many homes were still flooded. The number of dwellings needing disinfectant was recorded, and this information was of considerable value to the officials handling the material.

It is to be noted that the number of persons ill with the diseases listed in the summary table is normal for the total number involved, and that the number of illnesses of these types was to be expected in a population of the size under consideration. It is very interesting to see that 54 percent of the persons in the affected area moved, and the exact location of their temporary domicile was known by the sanitary authorities. The data on the damage to the homes and furnishings need no additional comment.

SUMMARY

The present paper gives, in brief, the methods used in conducting a preliminary sanitary survey of a flooded area. It also discusses the practical application of the data obtained from such a survey, and its potential value in case a serious outbreak of a communicable disease should occur. It is the feeling of the authors that the same technique could be projected on a larger scale so as to cover an entire State or several States.

RAT-PROOF CONSTRUCTION AND ITS EFFECT ON THE CONTROL OF RAT LIFE ON SHIPS

Instances of Permanent and Apparent Automatic Control Effected by this Type of Construction Observed on 50 Ships at the Port of New York

By B. E. Holsendorf, *Passed Assistant Pharmacist, United States Public Health Service*

From time immemorial it has been noted by persons associated with the shipping industry that the majority of rats living on board of vessels are found usually in the holds or cargo compartments. This condition of affairs was of such common occurrence and obtained on so many ships that the presence of rats in the cargo holds of ships was accepted as a matter of course.

Statistics compiled from reports submitted by Public Health Service officers in charge of several of the largest quarantine stations show

that the greater percentage of rats killed by fumigation or trapped were in the holds.[1]

In former years little thought was given to this matter and no attempt was made to ascertain the specific places that served rats so well as homes and breeding places.

When surveys were being conducted to obtain data for use in drafting the standard specifications and the collateral information given in the publication, The Rat Proofing of Vessels (third edition), issued by the United States Public Health Service, a rather complete list of such places was compiled. (This list will be found on pp. 29–32 of that publication.) As stated in that pamphlet, many of these spaces were so ideally suited for rat homes as to give the impression that they were especially designed for that purpose.

In the development of ratproofing methods it was found that, when ratproofing work of a fundamental character, that is, the elimination of enclosed spaces, had been carried out, the results of rat control were more permanent and the cost of this type of construction and its upkeep was, in most instances, considerably less than that of the conventional type.

In the light of this knowledge and experience, it was thought that it would be interesting and informative to study the histories (records of fumigation, trappings, reports of inspections and surveys) of a number of ships on which the elimination of enclosed spaces in cargo holds had been carried out when they were built and learn whether such ships had kept free from rat colony life.

It was realized that the histories of a great many ships of this type of construction would have to be studied and that they should cover periods of not less than 3 or 4 years and include vessels that were engaged in the transportation of diversified cargoes and had touched at the various ports of the world, especially those that were regarded as rat infested.

A list of 50 vessels was selected. Many of these ships were built prior to 1930. Several were more than 10 years old. Sixteen of them had been constructed prior to the publication of the specification for the ratproofing of ships. Therefore, the elimination of the

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[1] Annual Reports of the Surgeon General, U. S. Public Health Service, 1923, 1925, 1926.

"Approximately two-thirds of rodents recovered were found in the holds of vessels" (p. 138, Annual Report, 1923, and p. 140, Annual Report, 1925).

"Of a total number of 10,178 rats killed by fumigation, 7,683 were recovered in holds (p. 136, Annual Report, 1925).

"The 10,144 rats found after fumigation were distributed as follows:

Mess and ship's stores	1,081, or 10.65 percent.
Holds and all cargo spaces	7,231, or 71.29 percent.
Crews' quarters and staterooms	230, or 2.27 percent.
Other superstructure	1,602, or 15.79 percent."

(P. 143, Annual Report, 1926).

"Of the total number (1,837) of rats recovered (as a result of fumigation), 1,080 were from the holds of vessels" (p. 151, Annual Report, 1926).

raised wooden ceiling of flooring over tank tops in the lower holds had been done for reasons other than ratproofing, viz, the reduction of dead weight and because of construction costs.

It was thought that vessels falling in this category would be excellent subjects for survey and study. So far as could be ascertained, no thought had been given to the matter of fundamental rat control on ships that were built prior to 1925, and therefore no special effort had been made to promote it.

All of the vessels under consideration were regularly inspected at each visit to New York and many of them were fumigated a number of times during the period covered by the report, as indicated in the accompanying table. The information as to rat infestation and its extent, as well as regarding the number of rats retrieved after fumigation, was taken from the official reports.

It will be seen that few rats were killed or trapped on these ships, and in the majority of instances the results were negative, both as to fumigation and as to trapping.

These vessels carried diversified cargoes, usually classified as rat harboring or rat attractive, such as jute, rubber, cotton, fruits, grain, hemp, flour, and similar materials. Many of them touched at ports of India, the Far East, the Straits Settlements, and the Dutch East Indies. Notwithstanding the hazards usually associated with such factors, trading at infected and rat-infested ports and transporting cargoes of the character mentioned above, they have continued to remain practically free of rat colony life for the length of time that they have been in service, periods ranging from 4 to 10 or more years.

This freedom from rat infestation would hardly appear to be just a coincidence. It would seem to be due to some basic cause, very probably to the absence of enclosed spaces that could be used for breeding purposes and which would afford protection to the young during immaturity. The operation of this barrier against successful propagation appears to be automatic; for, in many of the cases cited, no attention had been paid to the matter of control of rat life through this medium on the vessels concerned prior to 1925 or 1926.

An analysis of trade routes involved reveals the following information:

Sixteen vessels were engaged in round-the-world service and touched at ports of Japan, China, Straits Settlements, Dutch East Indies, and the Philippine Islands.

Fifteen vessels touched at ports of the Far East and India.

Twelve vessels were engaged in trade on the North Atlantic and plied between ports of Europe and North America. One of these touched continually at ports of the Mediterranean Sea, and for more than 2 years was in the South American service, plying between South American ports and those of Italy.

Two are in the West Indies service and touch at Havana, New Orleans, and New York. Two touch at ports of Brazil, and three sail from New York to the West Coast via the Panama Canal.

A study of the histories of these vessels would appear to confirm the following findings, which should be given consideration in dealing with problems connected with the prevention of the spread of bubonic plague through the agency of maritime shipping.

First: That the absence of structural harborage, or harborage of a more or less permanent character, apparently exercises permanent control of rat colony life on ships by depriving rats of fixed facilities for breeding and protecting their young during the helpless stage of their early existence.

Second. That this control, as demonstrated in the cases of the vessels cited in the list given in this report, was exercised notwithstanding the fact (*a*) that a certain percentage of the cargo carried was of a rat-harboring and rat-attractive character, such as burlap, jute, raw cotton, rubber, oils, sugar, tapioca flour, and grain, and fruits at times; or (*b*) that these vessels traded at such ports as Calcutta, Bombay, Colombo, Port Sedan, Soerabaya, Singapore, Shanghai, Hong Kong, Penang, Manila, Port Said, Habana, east- and west-coast ports of the United States, and Italian ports. Many of these ports are generally regarded as being more or less rat-infested, and some are suspected of being infected with plague.

The history of rat life on the ships listed during the period of observation revealed the following:

(*a*) Twenty-five ships had kept entirely free from rodent infestation.

(*b*) On four ships a stray rat or two was reported on but one trip.

(*c*) On three ships a stray rat or two was reported on only two trips.

(*d*) On the nine vessels that showed indications of a slight or temporary infestation, rats were living in sections other than the cargo holds.

The quarantine history of the British freighter *City of Lincoln* (no. 50) presents some interesting facts and demonstrates the effect which the absence of structural harborage in cargo holds exerts on rat control in such compartments even when rat-colony life is present in other parts of the ship.

This vessel, which had been engaged in the far-eastern, Australian, and Indian trade, had for several years been badly rat-infested in and around the provision storeroom and domestic refrigerator, which were located in the extreme after part of the ship.

Rats were so numerous and had become so strongly entrenched in this refrigerator that practically the entire insulated space, which was filled with cork and asbestos, was honeycombed with nests containing young rats.

Repeated fumigations and trappings yielded very large numbers of rats. In one fumigation in 1922, 58 rats were retrieved; in another fumigation in 1928, 253 rats; and in July 1929 more than 450 rats were killed by fumigation and in a clean-up drive, at which time the refrigerator was reconstructed and ratproofed.

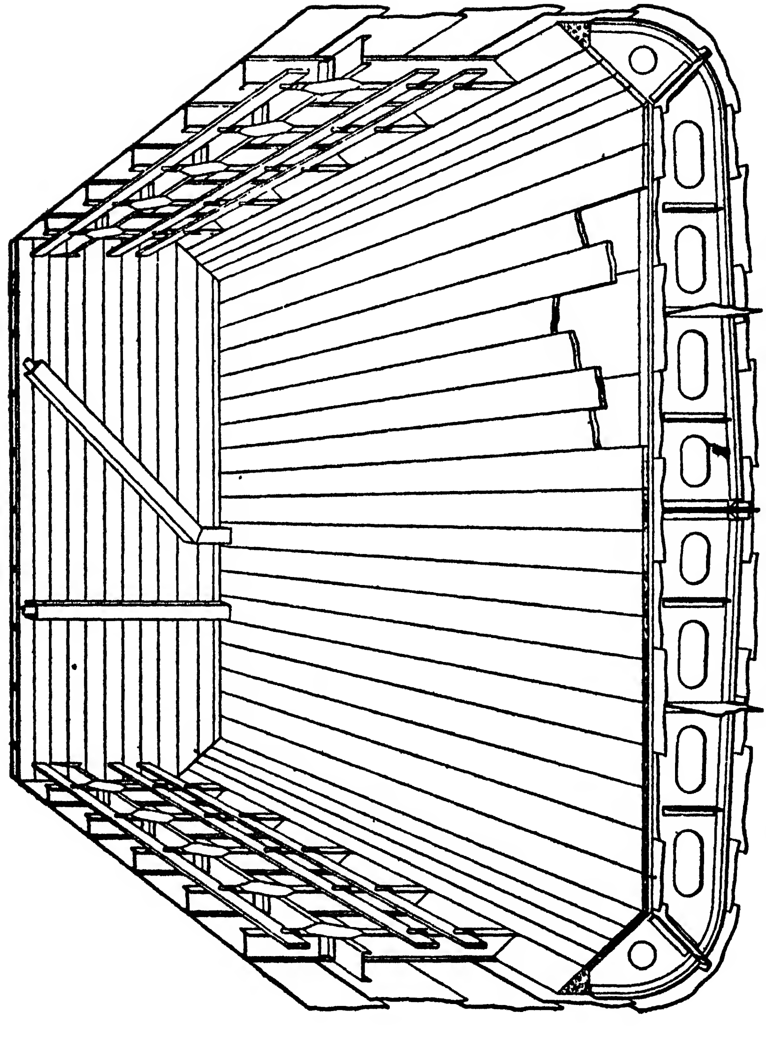
Strange as it may seem, notwithstanding the presence for several years of this large number of rats on board this vessel in the sections mentioned above, and of the opportunities which were offered them to pass from such nearby sections to the cargo holds (the infested refrigerator being installed in the passageway on the main deck), no colony rat life in the holds was discovered at any time that the vessel was inspected in New York. Reports obtained from the ship's officers and crew were to this effect also. The cargo usually carried was of a rat-attractive and rat-harboring character, as noted above.

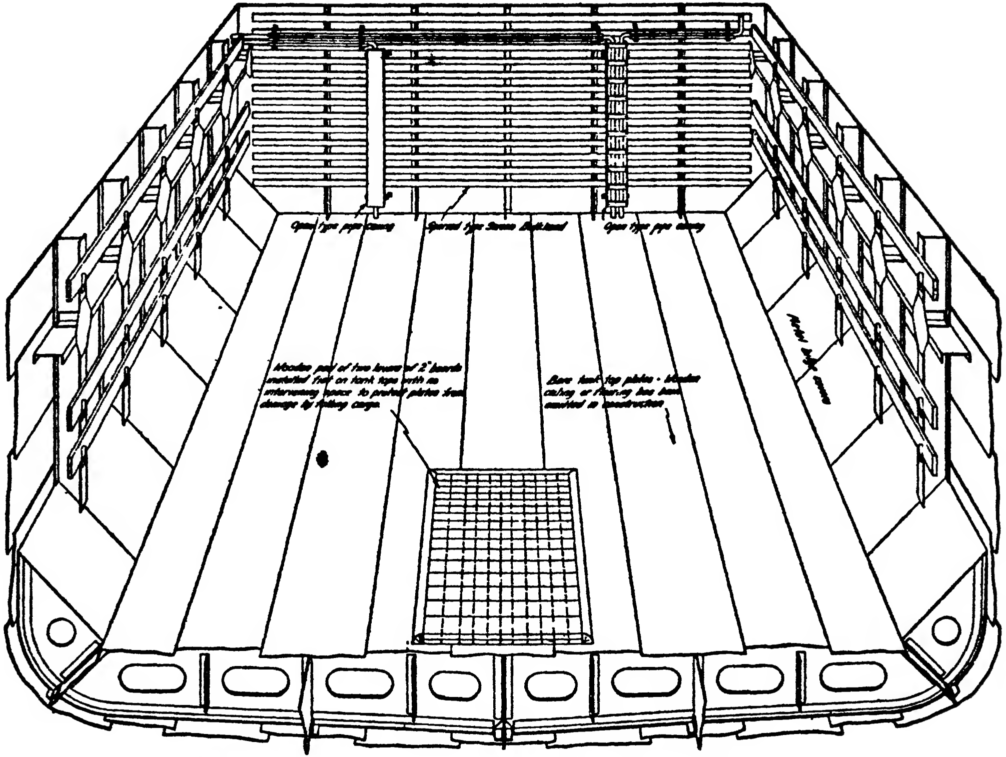
The holds of this vessel were constructed free from raised wooden ceilings over tank tops, and many of the pipe casings were of an open type, free from enclosed spaces which could be used for nesting and breeding purposes.

The *City of Lincoln* was inspected at the port of New York on two occasions after the refrigerator had been reconstructed and ratproofed, and some protective ratproofing work had been done in the storeroom section. Only a stray rat or two were discovered on these occasions. The ship was fumigated in January 1930, and only four rats were retrieved following fumigation.

It would appear that the lesson which might be learned from these surveys, and from a study of the quarantine histories of the ships mentioned, is that the type of vessel offering the least facilities for the propagation and perpetuation of rat life on board is one that has been designed and constructed in such a manner that enclosed spaces which have been or may be used as rat harborages are eliminated to the fullest possible extent. When harborage has been eliminated on vessels, as the histories of the ships presented in this report show, satisfactory permanent rat control has resulted and rodent life on such vessels has been reduced to a minimum, as is contemplated by the provisions of article 28 of the International Sanitary Convention of Paris, 1926.

While the data as to rat-infestation status of the vessels surveyed covers only the period given on the list, for reasons outlined in eligibility requirement no. 2, given below, there is every reason to believe that in the majority of instances these vessels have been practically free from rat life during their entire period of service, ranging from 8 to 20 years. (The table shows the year in which the vessels were built.) The condition of the ship, the absence of even old signs of the presence of rats, and the word-of-mouth history given by the





Sketch showing type of construction in lower cargo holds in which enclosed spaces which form rat harborages have been eliminated. The majority of ships cited in this report had bare tank top ceilings and one of the open type of pipe casings shown on sketch

long-service members of the crew of such ships tend to confirm this belief.

In order to be considered in this survey, each vessel had to comply with the requirements regarding—

(1) Type of construction of cargo holds.
(2) Minimum length of service, and inspection and fumigation records.
(3) Class of cargo transported and ports visited.

Under (1) it was required that the cargo holds should be free from wooden tank-top ceilings or flooring, and that the pipe casings be of an open or ratproof type.

Under (2), that the vessel had been in commission for at least 3 years and that bona-fide inspection reports and fumigation records covering such periods were available for reference and study.

And under (3), that the vessel had been engaged in the transportation of cargoes usually regarded as rat attractive or rat harboring, or that it had traded at ports generally regarded as suspicious of being plague infected and more or less rat infested.

There were a few exceptions made to the requirement mentioned in the latter part of no. 3. Several ships that were engaged exclusively in the North Atlantic trade were included in the list of 50 for the reason that they carried both rat-attractive and rat-harboring cargoes of foodstuffs, case and crated goods, as well as grain at certain seasons.

A few other ships, built without wooden ceilings in holds, were not included in this list, for the reason that official records giving the data contemplated by no. 2 were lacking. The reports available did not cover the minimum period specified.

Eight of these vessels, the British ships *Ajax*, built in 1931, *Adenvohr*, built in 1930, *Crispin*, built in 1935, *Maihar*, built in 1917, *River Delaware*, built in 1918, *Tantalus*, built in 1923, *Maron*, built in 1930, and the *Arctees*, built in 1934, gave negative histories so far as rat-colony life is concerned.

The majority of these vessels are engaged in the far-eastern and Indian Ocean trade, and transport cargoes very similar to those carried by the ships mentioned in the list.

There are practically no other ships constructed without wooden ceilings and similar features in lower holds which touch at New York. Those listed and mentioned in this report constitute practically all of this type of vessel available for survey and study at this port.

One of the accompanying sketches shows examples of methods of eliminating the usual enclosed spaces that form marked rat harborage in the cargo holds of ships. The other sketch shows the contrasting conditions—rat harborages formed by the enclosed spaces usually found in such compartments.

Histories and records of 50 vessels on which enclosed spaces in cargo holds have been eliminated

Vessel	Year built	Structural status of cargo holds as to harborage	History of rat infestation	Period under observation	Number of inspections or surveys	Times fumigated and number of rats retrieved [1]	Type of cargo	Ports of call
1. British S. S. *Adrastus* (cargo).	1923	No wooden ceilings over tank tops in lower holds. Open-type pipe casings.	Negative	1928–35	10	(1) No rats	Rubber, burlap, jute, hemp, tea, tin, coconuts, oil, tapioca.	Far East, Kobe, Shanghai, Suez, Port Said.
2. British S. S. *Ashburton* (cargo).	1926	do	do	1932–35	3	None recorded	General cargo, hides, ore.	Ports of Australia, Port Pirie, Freemantle.
3. British S. S. *Basil* (cargo).	1928	do	Slight infestation in 1933	1930–34	8	(3) 5 rats	Rubber, hides, machinery, wax, cocoa, cotton, nuts, flour, case oil.	Brazilian ports: Para, Bahia, Pernambuco, Natal, Victoria, Maceio, Parahyba.
4. British S. S. *Benedict* (cargo).	1929	do	Slight infestation—1 or 2 rats on 2 trips, 1934, 1935.	1930–35	5	(2) No rats	do	Do.
5. German S. S. *Bremen* (passenger and express cargo).	1929	do	Negative	1929–35	99	None	General express cargo	Cherbourg, Southampton, Bremen.
6. British S. S. *Britannic* (passenger and cargo.)	1930	No wooden ceilings over tank tops in lower holds and open-type pipe casings in all holds except section where refrigerators were installed.	Moderate infestation in crew's galley section and in refrigerator section for some months after being commissioned, due to existence of enclosed insulated spaces and brine pipes which had not been rat proofed.	1930–35	55	(3) 7 rats. Some rats were trapped in these sections in 1930–31.	Grain, fruits, case goods, etc., general cargo.	Liverpool.
7. American S. S. *California* (passenger and cargo).	1928	do	Negative after first few months, when stray rats from shipyard had been destroyed.	1928–35	60	(1) 11 rats	General cargo, fruits, flour, canned goods, nuts, etc.	Havana, Canal Zone, San Pedro, San Francisco.
8. British S. S. *California* (passenger and cargo).	1923	do	Slight localized infestation several times during early period of observation.	1926–35	50	(5) 3 rats	Grain, fruit, case goods, general cargo.	Glasgow, Halifax, Londonderry, Belfast.
9. British S. S. *Caledonia* (passenger and cargo).	1925	do	Slight infestation in galley section in 1927.	1926–35	94	No record of any fumigation.	do	Do.

[1] Number of fumigations in parentheses.

Histories and records of 50 vessels on which enclosed spaces in cargo holds have been eliminated—Continued

Vessel	Year built	Structural status of cargo holds as to harborage	History of rat infestation	Period under observation	Number of inspections or surveys	Times fumigated and number of rats retrieved [1]	Type of cargo	Ports of call
10. British S. S. *Cameronia* (passenger and cargo).	1921	No wooden ceilings over tank tops in lower hold. Open-type pipe casings.	Negative except for strays on 3 separate trips.	1927–35	82	No fumigation; 3 rats trapped.	General cargo, fruit, grain, case goods.	Glasgow, Halifax, Londonderry, Belfast.
11. British S. S. *Clytoneus* (cargo).	1930	do	Several stray rats reported on 2 inspections.	1931–34	6	(3) 1 rat	Hemp, tin, tea, jute, rubber, hides, tapioca, flour, burlap.	Hong Kong, Manila, Batavia, Soerabaya, Suez, Singapore, Port Said, Penang, Gibraltar.
12. British S. S. *Dardanus* (cargo).	1923	do	Negative	1929–35	5	(2) No rats	do	Do.
13. British S. S. *Empress of Australia* (passenger and cargo).	1913	No wooden ceilings over tank tops in lower holds; solid steel pipe casings completely closed.	Several strays on 2 voyages.	1930–35	7	(3) 2 rats	General express cargo, grain, fruit.	Quebec, Halifax, Cherbourg, Southampton.
14. British S. S. *Empress of Britain* (passenger and cargo).	1931	No wooden ceilings over tank tops in lower holds: open type pipe casings.	Slight in 1931 and 1933 in galley section.	1931–35	8	(1) 4 rats	General cargo, fruit, grain, case goods, etc.	Do.
15. German S. S. *Europa* (passenger and cargo).	1929	do	Negative in holds. Some infestation in deckhead and fixtures of galleys during first year and a half of service, until these conditions were ratproofed.	1929–35	90	(2) No rats. A number of rats were trapped in galley section prior to correction of deckhead defects.	General express cargo, case goods.	Cherbourg, Southampton, Bremen.
16. British S. S. *Georgic* (passenger and cargo).	1932	No wooden ceilings over tank tops in lower holds: open type pipe casings. No sheathing or double walls in crews' quarters, third class, nor tourists' section.	Negative	1932–35	29	(1) No rats	General cargo, fruits, grain, case goods, etc.	Liverpool, Cobh, Galway.
17. British S. S. *Glaucus* (cargo).	1921	No wooden ceilings over tank tops in lower holds and open type pipe casings.	do	1927–35	9	(1) No rats	Rubber, fruit, tea, tin, hemp, jute, tapioca flour, general cargo.	Canal Zone, Manila, Yokohama, Hong Kong, Kobe, Shanghai, Dutch East Indies.

18. British S. S. *Greystoke Castle* (cargo).	1927	do.	Negative except for one stray rat in 1932.	1927–35	18	(10) 1 rat.	General cargo, ore, tea, rubber, jute, burlap, tapioca flour.	Penang, Colombo, Manila, Batavia, Deli, Macassar, Singapore.
19. British S. S. *Helenus* (cargo).	1913	do.	Negative.	1921–35	2	(2) 13 rats.	Rubber, hemp, tea, tin, jute, flour.	Far East, Kobe, Yokohama, Hong Kong, Shanghai, Manila.
20. British S. S. *Laurentic* (passenger and cargo).	1927	do.	do.	1928–34	9	No record of any fumigation.	General cargo, grain, fruit, case goods, cloth, etc.	Liverpool, Cobh, Galway, Montreal.
21. British S. S. *Mahanada* (cargo.)	1914	do.	Slight infestation in storeroom and forepeak in 1932.	1930–35	6	(6) 14 rats.	Burlap, case goods, hides, tea, ore, jute, grain, cotton, shellac gum, etc.	Calcutta, Colombo, Port Sudan, Oran, Port Said.
22. British S. S. *Maidan* (cargo).	1925	do.	do.	1931–35	7	(4) No rats.	do.	Do.
23. British S. S. *Mahout* (cargo).	1925	do.	Negative.	1930–34	10	(1) No rats.	do.	Do.
24. British S S. *Mahronda* (cargo).	1925	do.	do.	1931–35	5	None.	do.	Do.
25. British S. S. *Mahseer* (cargo).	1925	do.	do.	1930–35	10	(2) No rats.	do.	Do.
26. British S. S. *Mahsud* (cargo).	1917	do.	do.	1931–35	11	(1) No rats.	do.	Do.
27. British S. S. *Markhor* (cargo).	1929	do.	do.	1931–34	9	None.	do.	Do.
28. British S. S. *Matra* (cargo).	1926	do.	do.	1926–35	7	None.	do.	Do.
29 British S. S. *Menestheus* (cargo).	1929	do.	do.	1930–35	4	(1) No rats.	do.	Far East, Manila, Hong Kong, Kobe, Yokohama, Shanghai.
30. British S. S. *Myrmidon* (cargo).	1930	do.	do.	1930–35	4	None.	Rags, jute, rubber, hemp, tin, tea, tapioca flour.	Far East, Dutch East Indies, Penang, Batavia, Port Said.
31. British S. S. *Penrith Castle* (cargo).	1929	do.	Negative, except for a slight infestation in 1933.	1929–35	14	(6) 9 rats.	Rubber, flour, tea, ore, hemp, tapioca, sago, sisal.	Penang, Manila, Macassar, Colombo, Batavia, Singapore.
32. American S. S. *Pennsylvania* (passenger and cargo).	1929	do.	Negative, after the few stray rats from shipyard were trapped in working alleyway near storeroom.	1929–35	10	None.	Cased and canned goods, fruits, general cargo.	Havana, Canal Zone, San Pedro, San Francisco.
33. British S. S. *Phemius* (cargo).	1913	do.	Negative.	1922–35	9	(2) No rats.	Burlap, jute, rubber, tea, tin, tapioca flour.	Far East, Manila, Hong Kong, Batavia, Soerabaya, Singapore, Penang.
34. Dutch S. S. *Polyphemius* (cargo).	1906	do.	Negative, except for a stray rat on several trips.	1930–32	3	(2) 1 rat.	do.	Do.
35. British S. S. *Rhexenor* (cargo).	1923	do.	1 rat, 1931.	1929–35	11	(2) 1 rat.	do.	Do.

[1] Number of fumigations in parentheses.

Histories and records of 50 vessels on which enclosed spaces in cargo holds have been eliminated—Continued

Vessel	Year built	Structural status of cargo holds as to harborage	History of rat infestation	Period under observation	Number of inspections or surveys	Times fumigated and number of rats retrieved [1]	Type of cargo	Ports of call
36. American S. S. *Seatrain Havana* (loaded freight cars).	1932	No wooden ceilings over tank tops in lower holds; open holds for storage of loaded freight cars.	Negative.	1932–35	35	None.	Freight cars loaded with fruits, vegetables, etc., and general food supplies on return voyage.	Havana, New Orleans, New York.
37. American S. S. *Seatrain New York* (loaded freight cars).	1932	do.	Negative, during whole period except for evidence of stray rat in March 1933.	1932–35	21	None.	do.	Do.
38. Dutch S. S. *Statendam* (passenger and cargo).	1929	No wooden ceilings over tank tops in lower holds; open-type pipe casings.	Negative since 1931. Moderate infestation in superstructure for first year; negative thereafter. Ratproofing work was carried out in superstructure for more than a year after vessel was commissioned.	1929–35	53	(8) 34 rats. A number of rats were trapped by the crew in the superstructure, storeroom, and galleys during the first year.	Grain, fish, case goods, cheese.	Rotterdam.
39. British S. S. *[illegible]* (cargo).	1930	do.	Slight infestation reported on 1 occasion.	1929–34	4	(3) 2 rats.	Rubber, jute, tapioca, flour, burlap in bales, general cargo.	Suez, Port Said, Dutch East Indies, Singapore.
40. British S. S. *Silverpalm* (cargo).	1930	do.	Negative, except for 1 or 2 stray rats reported on 2 trips.	1930–32	13	(5) No rats.	Rubber, flour, tin, tea, hemp, coconut oil, some fruits, jute.	Yokohama, Shanghai, Hong Kong, Soerabaya, Manila, Batavia, Colombo, Penang, Rangoon.
41. British S. S. *Silversandal* (cargo).	1930	do.	Negative, except for 1 stray rat reported on 1 trip.	1930–35	18	(1) No rats.	do.	Do.
42. British S. S. *Silver[illegible]* (cargo).	1930	do.	Negative.	1930–35	16	None.	do.	Do.
43. British S. S. *Silverwalnut* (cargo).	1930	do.	Negative; 1 reported killed while loading bananas in 1933.	1930–35	18	(2) No rats.	do.	Do.
44. British S. S. *Silveryew* (cargo).	1930	do.	Negative.	1930–35	14	(3) No rats.	do.	Do.
45. British S. S. *Thurland Castle* (cargo).	1929	do.	do.	1929–35	10	(7) No rats.	General cargo, ore, tea, jute, rubber, burlap, tapioca.	Macassar, Deli, Singapore, Manila, Penang, Colombo, Batavia.

46. British S. S. *Transylvania* (passenger and cargo).	1925	do	Had moderate infestation in galley section and baggage room until 1929; negative since.	1926–34	81	(4) 2 rats	Case goods, grain, fruit, meats, general cargo.	Glasgow, Halifax, Londonderry, Belfast.
47. American S. S. *Virginia* (passenger and cargo).	1929	do	Negative	1929–35	46	None	do	Habana, Canal Zone, San Pedro, San Francisco.
48. British S. S. *Ruby Castle* (cargo).	1925	do	Moderate infestation in 1930.	1930–35	13	(4) 13 rats	General cargo, jute, tea, ore, rubber, tapioca, flour.	Macassar, Manila, Penang, Colombo, Singapore, Batavia
49. Italian S. S. *Conte Grande* (passenger and cargo).	1928	do	Slight infestation in galley and linen room located in no.2 hold for a short time after going into commission; negative since 1930	1928–35	52	(25) A few rats	Oils, fruit, nuts, case goods, flour, general cargo.	Genoa, Naples, Malta, Gibraltar, Buenos Aires.
50. British S. S. *City of Lincoln* (cargo).	1911	do	Practically negative in cargo holds; refrigerators and store room in poop space badly infested from 1922 to 1929.	1922–33	6	(6) 781 rats	Rubber, jute, burlap, tin, hides.	Ports of New Zealand, Singapore, Macassar, Telok, Port Said, and ports of India.

DEATHS DURING WEEK ENDED MAY 9, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 9, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	9,044	8,590
Deaths per 1,000 population, annual basis	12.6	12.0
Deaths under 1 year of age	612	501
Deaths under 1 year of age per 1,000 estimated live births	55	54
Deaths per 1,000 population, annual basis, first 19 weeks of year	13.5	12.6
Data from industrial insurance companies:		
Policies in force	68,210,804	67,734,820
Number of death claims	13,873	12,868
Death claims per 1,000 policies in force, annual rate	10.6	9.9
Death claims per 1,000 policies, first 19 weeks of year, annual rate	10.9	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks ended May 16, 1936, and May 18, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 16, 1936, and May 18, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935
New England States:								
Maine	1	5	1	2	375	178	0	0
New Hampshire					35	5	0	0
Vermont	2				437	49	0	0
Massachusetts	9	4			1,614	423	8	0
Rhode Island		2			68	498	0	0
Connecticut	1	2	2		233	1,202	2	1
Middle Atlantic States:								
New York	37	39	[1] 3	[1] 8	3,170	2,876	27	35
New Jersey	12	30	3	11	499	2,166	2	3
Pennsylvania	34	23			616	3,438	12	2
East North Central States:								
Ohio	24	35	75	73	542	2,056	13	10
Indiana	7	20	40	14	36	229	6	6
Illinois	39	42	29	47	35	1,861	15	24
Michigan	12	11		1	164	4,217	3	0
Wisconsin	6	2	53	89	167	1,505	0	1
West North Central States:								
Minnesota	1	12	1	2	530	520	3	0
Iowa	5	9		8	5	331	4	2
Missouri	12	25	72	37	30	448	4	20
North Dakota	1	4	12		1	15	0	0
South Dakota	1				1	37	0	0
Nebraska	1	5			41	295	2	2
Kansas	8	6	20	4	8	821	0	1
South Atlantic States:								
Delaware		2			27	6	0	0
Maryland [2] [3]	5	6	3	8	454	73	11	9
District of Columbia [3]	17	10			186	49	7	8
Virginia	7	18	68		136	506	8	23
West Virginia	7	13	36	12	74	384	8	4
North Carolina	14	23	5	9	47	150	8	8
South Carolina	4	2	126	72	32	13	3	0
Georgia [4]	9	3					1	1
Florida [4]	4	2	7	3	25	23	3	0
East South Central States:								
Kentucky	6	7	58	24	38	283	20	2
Tennessee	4	6	71	18	28	18	9	7
Alabama [4]	5	8	54	26	30	122	1	0
Mississippi [3]	6	6					0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 16, 1936, and May 18, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935
West South Central States:								
Arkansas	5	8	96	37	3	73	1	0
Louisiana	12	17	506	6	27	56	4	1
Oklahoma [5]	7	2	66	65	46	67	2	1
Texas [4]	37	35	211	86	325	117	7	3
Mountain States:								
Montana [3]	--------	5	58	45	5	592	0	0
Idaho	--------	--------	1	3	21	2	0	1
Wyoming [3]	--------	--------	--------	--------	2	23	0	0
Colorado	1	8	--------	--------	19	405	1	0
New Mexico	4	1	10	9	44	9	0	0
Arizona	--------	9	48	8	110	13	1	0
Utah [3]	--------	1	--------	--------	22	1	1	0
Pacific States:								
Washington	1	7	--------	--------	414	524	2	2
Oregon [3]	2	3	19	15	151	210	0	2
California [3]	26	24	259	47	1,908	1,714	7	5
Total	396	502	2,013	789	12,781	28,608	206	179
First 20 weeks of year	10,966	13,029	134,758	99,537	194,175	550,132	4,721	2,843

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935
New England States:								
Maine	0	0	22	9	0	0	3	1
New Hampshire	0	0	1	17	0	0	1	0
Vermont	0	0	7	2	0	0	0	1
Massachusetts	1	0	218	210	0	0	2	4
Rhode Island	0	0	27	19	0	0	0	0
Connecticut	0	0	36	104	0	0	1	1
Middle Atlantic States:								
New York	3	1	781	1,020	0	0	17	8
New Jersey	0	0	285	179	0	0	4	1
Pennsylvania	1	0	338	598	0	0	4	10
East North Central States:								
Ohio	0	0	320	638	0	0	5	7
Indiana	2	0	134	96	3	2	4	3
Illinois	1	0	680	1,131	13	2	6	7
Michigan	0	0	284	304	2	0	8	3
Wisconsin	1	1	431	467	7	17	1	1
West North Central States:								
Minnesota	0	0	366	364	4	3	0	1
Iowa	0	1	137	79	31	10	1	1
Missouri	0	0	140	34	29	4	3	5
North Dakota	0	0	39	43	3	1	0	0
South Dakota	0	0	53	25	32	2	0	0
Nebraska	0	0	87	56	16	17	0	0
Kansas	0	0	212	44	25	18	3	3
South Atlantic States:								
Delaware	0	0	2	10	0	0	0	0
Maryland [2] [3]	0	0	43	103	0	0	2	5
District of Columbia [3]	0	0	24	43	0	0	0	0
Virginia	0	1	51	17	1	0	6	2
West Virginia	0	0	26	62	0	0	6	11
North Carolina	1	2	11	17	1	0	4	1
South Carolina	2	0	3	3	0	0	5	12
Georgia [4]	0	0	25	6	0	0	11	14
Florida [4]	0	1	9	1	0	0	5	6
East South Central States:								
Kentucky	0	0	20	21	0	0	4	8
Tennessee	0	1	17	16	0	0	5	3
Alabama [4]	0	0	4	7	0	3	3	6
Mississippi [3]	0	0	5	7	2	0	2	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 16, 1936, and May 18, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935	Week ended May 16, 1936	Week ended May 18, 1935
West South Central States:								
Arkansas	1	0	3	4	0	5	1	4
Louisiana	0	4	5	2	0	0	8	13
Oklahoma [5]	0	1	56	6	1	0	7	0
Texas [4]	1	1	46	28	7	8	14	22
Mountain States:								
Montana [3]	2	0	114	6	16	8	1	1
Idaho	0	0	17	8	3	0	1	0
Wyoming [3]	0	0	20	15	0	2	0	2
Colorado	0	0	66	167	3	0	0	1
New Mexico	0	0	61	5	0	0	0	3
Arizona	0	0	44	24	0	0	2	3
Utah [2]	0	0	68	131	4	0	6	0
Pacific States:								
Washington	0	2	61	48	5	34	0	1
Oregon [3]	0	0	25	15	13	8	4	5
California [3]	5	3	337	241	2	11	5	9
Total	21	19	5,761	6,452	223	155	154	192
First 20 weeks of year	359	478	150,899	142,869	4,619	3,778	2,299	2,782

[1] New York City only.
[2] Week ended earlier than Saturday
[3] Rocky Mountain spotted fever, week ended May 16, 1936, 16 cases, as follows: Maryland, 1; District of Columbia, 1; Montana, 6; Wyoming, 5; Oregon, 2; California, 1.
[4] Typhus fever, week ended May 16, 1936, 22 cases, as follows: Georgia, 7; Florida, 1; Alabama, 2; Texas, 12.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
February 1936										
New Hampshire			15				0	48	0	0
March 1936										
Colorado	5	37	7		82		0	498	18	1
New Hampshire			6					28	0	0
April 1936										
Alabama	18	51	4,017	131	133	26	1	25	1	5
Florida	22	14	139	4	66	6	1	22	0	11
Indiana	23	47	378	2	105		1	1,235	16	4
Maine	3	2	156		555		0	55	0	3
Maryland	76	14	67	1	1,274			299	0	4
Michigan	14	40	40	10	400		2	1,339	2	17
Minnesota	11	15	4	1	1,803		1	1,611	81	2
New Hampshire							0	25	0	5
New Jersey	32	48	106	3	1,448		0	1,675	0	9
New Mexico	8	12	111	1	184	2	0	298	0	1
Ohio	63	77	358	6	1,452	1	4	1,672	3	68
South Carolina		91	1,197	437	136	77	0	10	1	6
Tennessee	32	30	2,119	97	292	20	1	108	0	17

March 1936	Cases
Colorado:	
Chickenpox	398
Epidemic encephalitis	1
Impetigo contagiosa	12
Jaundice	1
Mumps	813
Undulant fever	1
Vincent's infection	2
Whooping cough	104
April 1936	
Anthrax:	
New Jersey	2
Chickenpox:	
Alabama	69
Florida	128
Indiana	218
Maine	89
Maryland	339
Michigan	1,357
Minnesota	331
New Jersey	1,307
New Mexico	99
Ohio	1,302
South Carolina	51
Tennessee	76
Diarrhea:	
Maryland	5
Ohio (under 2 years)	7
South Carolina	134
Dysentery:	
Florida	1
Maryland (bacillary)	3
Michigan (amoebic)	5
Michigan (bacillary)	1
New Mexico (amoebic)	2
Tennessee	2
Epidemic encephalitis:	
Maryland	1
Michigan	1
New Jersey	1
New Mexico	1
South Carolina	3
Tennessee	2
Food poisoning:	
New Mexico	1
German measles:	
Alabama	1
Maryland	514
Michigan	1,090
New Jersey	617
New Mexico	4
Ohio	244

April 1936—Continued	Cases
German measles—Con.	
South Carolina	19
Tennessee	24
Hookworm disease:	
South Carolina	30
Tennessee	1
Impetigo contagiosa:	
Maryland	7
Michigan	1
Tennessee	4
Lead poisoning:	
Michigan	3
New Jersey	1
Ohio	5
Mumps:	
Alabama	563
Florida	156
Indiana	407
Maine	701
Maryland	802
Michigan	1,479
New Jersey	1,447
New Mexico	333
Ohio	1,344
South Carolina	180
Tennessee	317
Ophthalmia neonatorum:	
Alabama	1
Maryland	1
New Jersey	19
Ohio	52
South Carolina	5
Tennessee	8
Paratyphoid fever:	
Michigan	1
Tennessee	1
Puerperal septicemia:	
New Mexico	4
Tennessee	-
Rabies in animals:	
Alabama	90
Indiana	61
Maryland	3
Michigan	1
New Jersey	21
South Carolina	39
Scabies:	
Maryland	1
Tennessee	8
Septic sore throat:	
Maine	4
Maryland	13
Michigan	93

April 1936—Continued	Cases
Septic sore throat—Con.	
Minnesota	3
New Mexico	8
Ohio	142
Tennessee	8
Tetanus:	
Alabama	5
Maryland	1
New Jersey	1
New Mexico	1
Ohio	1
Tennessee	2
Trachoma:	
Michigan	1
New Mexico	1
Ohio	1
Tennessee	2
Tularaemia:	
Alabama	2
South Carolina	1
Tennessee	2
Typhus fever:	
Alabama	8
South Carolina	1
Undulant fever:	
Alabama	2
Florida	5
Indiana	2
Maine	1
Maryland	2
Michigan	6
Minnesota	9
New Jersey	1
Ohio	5
Vincent's infection:	
Maine	3
Maryland	7
Michigan	34
Tennessee	25
Whooping cough:	
Alabama	62
Florida	57
Indiana	165
Maine	86
Maryland	234
Michigan	1,241
Minnesota	169
New Jersey	610
New Mexico	83
Ohio	817
South Carolina	29
Tennessee	81

CEREBROSPINAL MENINGITIS ON STEAMSHIP AT FALL RIVER, MASS.

A report under date of May 12, 1936, states that a case of cerebrospinal meningitis, found on May 11 on the steamship *Wm. C. Atwater* in port at Fall River, Mass., was removed to the Union Hospital in Fall River, and later, upon diagnosis, transferred to the Fall River Contagious Hospital.

CASES OF VENEREAL DISEASES REPORTED FOR MARCH 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama [1]				
Arizona	67	1.47	92	2.01
Arkansas [2]	238	1.27	146	.78
California	1,256	2.04	1,020	1.66
Colorado [3]				
Connecticut	233	1.41	87	.53
Delaware	119	4.92	43	1.78
District of Columbia [1]				
Florida	296	1.88	130	.83
Georgia	1,285	4.41	495	1.70
Idaho	0	0	0	0
Illinois	1,511	1.92	931	1.18
Indiana	103	.31	137	.41
Iowa [2]	76	.31	106	.43
Kansas	78	.41	46	.24
Kentucky	259	.97	240	.90
Louisiana	233	1.08	131	.60
Maine	40	.50	41	.51
Maryland	818	4.90	208	1.21
Massachusetts	492	1.13	485	1.12
Michigan	480	.94	528	1.04
Minnesota	256	.98	260	1.00
Mississippi	1,241	6.03	1,925	9.36
Missouri	236	.64	65	.18
Montana [2]	23	.43	29	.54
Nebraska	27	.19	60	.43
Nevada [3]				
New Hampshire	14	.30	17	.36
New Jersey	521	1.23	204	.48
New Mexico	55	1.26	45	1.03
New York	6,673	5.11	1,544	1.18
North Carolina	1,435	4.35	377	1.14
North Dakota	40	.58	45	.65
Ohio [2]	598	.67	157	.23
Oklahoma [2]	163	.66	134	.54
Oregon	46	.46	78	.79
Pennsylvania [4]	232	.24	125	.13
Rhode Island	148	2.10	64	.91
South Carolina [2]	191	1.09	283	1.62
South Dakota	10	.14	21	.30
Tennessee	1,017	3.80	443	1.66
Texas	274	.45	175	.29
Utah [3]				
Vermont	18	.50	15	.42
Virginia	683	2.79	259	1.06
Washington	123	.76	147	.91
West Virginia	179	1.00	68	.88
Wisconsin [2]	26	.09	119	.40
Wyoming [3]				
Total	21,813	1.80	11,520	.95

See footnotes at end of table.

Reports from cities of 200,000 population or over

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio	18	0.66	8	0.29
Atlanta Ga.	158	5.50	145	5.05
Baltimore, Md.	530	6.42	115	1.39
Birmingham, Ala.[1]				
Boston, Mass.	221	2.79	179	2.26
Buffalo, N. Y.	174	2.94	68	1.15
Chicago Ill.	848	2.38	616	1.73
Cincinnati, Ohio	70	1.50	40	.86
Cleveland, Ohio	172	1.85	70	.75
Columbus, Ohio	76	2.49	13	.43
Dallas, Tex.	77	2.66	15	.52
Dayton, Ohio [1]				
Denver, Colo.	12	.40	26	.88
Detroit, Mich.[1]				
Houston, Tex.[6]	184	5.49	54	1.61
Indianapolis, Ind.	30	.80	41	1.09
Jersey City, N. J.	1	.03	1	.03
Kansas City, Mo.	91	2.16	7	.17
Los Angeles, Calif.	394	2.75	248	1.73
Louisville, Ky.[1]				
Memphis, Tenn.	189	7.08	62	2.32
Milwaukee, Wis.	5	.08	15	.24
Minneapolis, Minn.	91	1.87	92	1.89
Newark, N. J.	223	4.81	103	2.22
New Orleans, La.	84	1.75	53	1.11
New York, N. Y.	4,703	6.44	1,016	1.39
Oakland, Calif.	60	1.98	72	2.37
Omaha, Nebr.	11	.50	13	.59
Philadelphia, Pa.	211	1.06	40	.25
Pittsburgh, Pa.	40	.58	19	.28
Portland, Oreg.	16	.51	57	1.82
Providence, R. I.	76	2.93	31	1.20
Rochester, N. Y.	51	1.51	44	1.31
St. Louis, Mo.	260	3.11	58	.69
St. Paul, Minn.	33	1.17	39	1.38
San Antonio, Tex.[1]				
San Francisco, Calif.	119	1.77	128	1.91
Seattle, Wash.	90	2 37	109	2.87
Syracuse, N. Y.	96	4.40	46	2.11
Toledo, Ohio	53	1.74	24	.79
Washington, D. C.[1]				

[1] No report for current month.
[2] Incomplete.
[3] Not reporting.
[4] Includes only those cases that enter the clinics conducted by State department of health.
[5] Only cases of syphilis in the infectious stage are reported.
[6] Reported by the Jefferson Davis Hospital; physicians are not required to report venereal diseases.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 9, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	47	7	2	0	0	1	14	30
New Hampshire:											
Concord	0	------	0	0	1	1	0	1	0	0	6
Manchester	0	------	0	0	1	2	0	0	0	0	8
Nashua	0	------	------	59	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	92	0	0	0	0	0	1	5
Rutland	0	------	0	47	1	0	0	0	0	1	6
Massachusetts:											
Boston	2	------	1	367	25	77	0	9	1	25	212
Fall River	0	------	0	9	2	11	0	1	0	0	23
Springfield	0	------	0	3	2	8	0	0	0	3	41
Worcester	1	------	0	120	7	14	0	2	1	8	41
Rhode Island:											
Pawtucket	0	------	0	6	6	9	0	0	0	0	17
Providence	0	------	0	28	3	5	0	4	0	0	52
Connecticut:											
Bridgeport	1	3	1	7	3	4	0	0	0	0	33
Hartford	0	------	0	8	0	6	0	1	1	0	30
New Haven	0	------	0	1	3	3	0	1	6	41	42
New York:											
Buffalo	0	------	0	80	14	42	0	10	0	3	151
New York	63	6	4	2,462	124	401	0	90	6	74	1,506
Rochester	0	------	1	1	5	2	0	3	0	1	90
Syracuse	0	------	0	190	5	17	0	1	0	5	60
New Jersey:											
Camden	1	------	0	8	2	4	0	0	0	1	34
Newark	0	5	0	19	6	73	0	4	0	15	101
Trenton	0	------	1	0	5	5	0	1	0	9	38
Pennsylvania:											
Philadelphia	7	4	0	718	43	79	0	31	3	78	545
Pittsburgh	8	4	2	10	52	86	0	14	1	20	224
Reading	0	------	0	16	2	1	0	2	0	4	28
Scranton	2	------	------	0	------	3	0	------	0	0	------
Ohio:											
Cincinnati	2	------	1	41	14	22	0	6	0	0	151
Cleveland	2	12	4	127	24	55	0	18	1	118	223
Columbus	1	3	3	1	6	9	0	2	1	5	95
Toledo	0	2	1	29	9	2	0	6	0	25	81
Indiana:											
Anderson	0	------	1	0	3	4	0	0	0	8	16
Fort Wayne	0	------	0	0	1	6	0	0	0	0	25
Indianapolis	1	------	2	2	22	39	0	6	0	15	121
Muncie	0	------	1	0	3	0	0	0	0	0	15
South Bend	1	------	1	0	3	3	0	1	0	7	31
Terre Haute	0	------	0	0	0	6	0	0	0	0	24
Illinois:											
Alton	0	------	0	0	0	4	0	0	0	5	8
Chicago	14	12	5	21	84	187	0	36	4	109	829
Elgin	0	------	0	0	2	2	0	0	0	0	9
Moline	0	------	1	0	0	4	0	0	0	0	14
Springfield	0	------	0	2	4	7	0	0	0	8	20
Michigan:											
Detroit	6	------	1	36	32	155	0	11	1	265	300
Flint	0	------	0	3	12	14	0	2	0	9	37
Grand Rapids	0	------	0	3	0	6	0	1	0	5	41
Wisconsin:											
Kenosha	0	------	0	0	0	6	0	0	0	0	8
Madison	0	------	0	6	1	11	0	0	0	8	20
Milwaukee	0	3	3	10	9	76	0	4	0	115	124
Racine	0	------	0	5	0	12	0	0	0	2	10
Superior	0	------	0	0	1	25	0	0	0	0	11
Minnesota:											
Duluth	0	------	0	2	8	15	0	1	0	11	85
Minneapolis	1	------	1	186	7	78	0	1	1	14	122
St. Paul	0	------	0	149	10	27	0	3	0	1	70
Iowa:											
Cedar Rapids	1	------	------	1	------	3	0	------	0	8	------
Davenport	0	------	------	0	------	7	0	------	0	0	------
Des Moines	0	------	------	0	------	13	17	------	0	0	29
Sioux City	0	------	------	1	------	7	18	------	0	0	------
Waterloo	2	------	------	0	------	5	0	------	0	0	------

City reports for week ended May 9, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	1	------	1	0	13	101	0	4	0	6	95
St. Joseph	0	------	0	0	4	1	4	4	0	0	39
St. Louis	9	------	3	9	14	44	0	12	0	6	246
North Dakota:											
Fargo	0	------	0	0	0	2	0	0	0	2	10
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	2	0	0	0	0	8
South Dakota:											
Aberdeen	0	------	------	0	------	3	0	------	0	0	------
Sioux Falls	0	------	0	0	0	7	0	0	0	0	10
Nebraska:											
Omaha	1	------	0	10	5	43	4	3	0	0	81
Kansas:											
Lawrence	0	------	0	0	1	1	3	0	0	0	2
Topeka	0	------	2	0	5	88	0	1	0	6	29
Wichita	0	1	1	4	4	21	0	1	0	3	30
Delaware:											
Wilmington	1	------	0	2	0	0	0	0	0	1	28
Maryland:											
Baltimore	1	3	2	321	32	20	0	17	0	68	238
Cumberland	0	------	0	0	3	0	0	1	0	0	15
Frederick	0	------	0	1	0	0	0	0	0	0	3
District of Columbia:											
Washington	16	1	1	187	25	17	0	12	1	34	186
Virginia:											
Lynchburg	0	------	1	4	0	3	0	0	0	14	9
Norfolk	0	------	0	2	5	2	0	1	0	2	26
Richmond	0	------	3	1	6	22	0	2	0	[illegible]	64
Roanoke	0	------	0	0	1	1	0	0	0	0	16
West Virginia:											
Charleston	1	1	0	0	3	1	0	1	1	0	9
Huntington	2	------	------	0	------	0	0	------	0	0	------
Wheeling	0	------	------	48	------	0	0	------	1	0	------
North Carolina:											
Gastonia	0	------	0	0	0	0	0	1	0	0	5
Raleigh	0	------	0	0	2	0	0	0	0	10	19
Wilmington	0	------	0	0	3	0	0	1	0	0	12
Winston-Salem	0	------	1	23	0	0	0	2	1	0	17
South Carolina:											
Charleston	0	4	0	0	0	1	0	1	0	0	13
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	3	0	0	0	0	1	11
Greenville	0	------	0	2	9	0	0	1	0	0	29
Georgia:											
Atlanta	1	4	1	0	11	9	0	0	0	1	77
Brunswick	0	------	0	0	0	0	0	0	0	0	3
Savannah	0	4	1	0	2	1	0	0	0	0	26
Florida:											
Miami	1	4	3	3	2	2	0	0	0	11	26
Tampa	0	1	1	25	1	2	0	0	1	0	23
Kentucky:											
Ashland	1	------	------	2	------	1	0	------	0	2	------
Covington	0	------	0	3	1	2	0	1	0	0	16
Lexington	------	------	------	------	------	------	------	------	------	------	------
Louisville	3	1	0	33	8	6	0	3	1	9	62
Tennessee:											
Knoxville	0	3	0	15	7	0	0	1	2	0	35
Memphis	0	------	3	2	12	2	0	1	0	7	95
Nashville	0	------	1	2	10	2	0	3	0	0	52
Alabama:											
Birmingham	1	------	1	0	10	1	0	4	0	1	65
Mobile	0	------	0	0	1	1	0	1	0	0	16
Montgomery	0	1	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	0	0	------	0	0	------
Little Rock	1	100	2	0	3	1	0	1	1	0	7
Louisiana:											
Lake Charles	0	------	0	2	0	1	0	0	0	0	4
New Orleans	6	21	9	4	23	1	0	21	1	76	171
Shreveport	0	------	0	0	5	0	0	4	1	0	40
Oklahoma:											
Oklahoma City	1	16	0	0	4	4	0	0	0	4	55
Tulsa	0	------	------	0	------	3	0	------	0	------	------
Texas:											
Dallas	4	3	3	68	6	0	0	1	0	2	66
Fort Worth	0	------	1	1	1	2	0	0	1	0	42
Galveston	0	------	0	1	4	1	0	1	0	0	19

City reports for week ended May 9, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Texas—Continued.											
Houston	11		2	2	4	1	0	2	1	0	61
San Antonio	2		0	31	2	0	0	3	1	0	67
Montana:											
Billings	0		0	0	0	1	1	0	0	0	7
Great Falls	0		0	0	0	3	0	0	0	0	9
Helena	0		0	0	0	5	0	0	0	0	6
Missoula	0		0	0	1	3	0	1	0	0	6
Idaho:											
Boise	0		0	1	1	3	0	0	0	0	6
Colorado:											
Colorado Springs	0		0	0	4	3	0	0	0	1	14
Denver	0		1	21	3	17	0	6	0	12	71
Pueblo	0		1	0	2	18	0	0	0	9	7
New Mexico:											
Albuquerque	1		1	3	0	4	0	1	0	1	11
Utah:											
Salt Lake City	0		0	8	3	18	2	1	0	12	38
Nevada:											
Reno											
Washington:											
Seattle											
Spokane	0	1	1	7	3	32	0	1	0	12	32
Tacoma	0		1	28	7	7	0	0	0	0	45
Oregon:											
Portland	0		0	14	3	4	0	1	1	0	75
Salem	1	1		5		3	0		3		
California:											
Los Angeles	8	12	0	391	14	42	0	27	0	56	292
Sacramento	1		0	3	1	6	0	0	4	7	38
San Francisco	1		0	163	9	71	0	8	0	24	169

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Maine:			
Portland	0	1	0
Massachusetts:			
Boston	4	2	0
Worcester	0	0	1
Rhode Island:			
Providence	1	0	0
Connecticut:			
New Haven	2	0	0
New York:			
Buffalo	3	0	0
New York	20	6	0
Syracuse	0	1	0
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	1	1	0
Pittsburgh	6	3	1
Ohio:			
Cincinnati	3	1	0
Cleveland	1	0	0
Columbus	0	1	0
Toledo	1	0	0
Indiana:			
Fort Wayne	1	0	0
Indianapolis	2	3	0
Illinois:			
Chicago	4	3	0
Michigan:			
Detroit	1	2	0
Minnesota:			
Duluth	0	0	1
Minneapolis	2	1	0
St. Paul	0	1	0
Missouri:			
Kansas City	1	0	0
St. Joseph	1	1	0
St. Louis	2	0	0

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Maryland:			
Baltimore	6	3	0
District of Columbia:			
Washington	1	4	0
West Virginia:			
Wheeling	1		0
North Carolina:			
Wilmington	3	0	0
South Carolina:			
Charleston	3	0	0
Georgia:			
Atlanta	3	2	0
Kentucky:			
Ashland	1	0	0
Louisville	2	0	0
Tennessee:			
Knoxville	2	0	0
Memphis	1	1	0
Nashville	1	0	0
Louisiana:			
New Orleans	0	2	0
Shreveport	0	1	0
Oklahoma:			
Oklahoma City	1	1	0
Texas:			
Houston	3	6	0
Colorado:			
Denver	1	0	0
Utah:			
Salt Lake City	2	1	0
California:			
Los Angeles	4	3	1
San Francisco	1	0	0

Dengue.—Cases: Charleston, S. C., 1.
Epidemic encephalitis.—Cases: Trenton, 1.
Pellagra.—Cases: Chicago, 1; Wilmington, N. C., 1; Savannah, 5; Miami, 1; Birmingham, 1; Dallas, 1.
Typhus fever.—Cases: Savannah, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended May 2, 1936.—During the 2 weeks ended May 2, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				2					2	4
Chicken pox		9	5	140	436	42	32	18	120	802
Diphtheria		5	1	27	9	4	6			52
Dysentery				2						2
Erysipelas				19	6	8	1		10	44
Influenza		24		28	120	5	2		146	325
Measles		66	103	1,263	4,986	518	285	102	2,024	9,347
Mumps		16			968	24	76	22	207	1,313
Paratyphoid fever								1		1
Pneumonia		1			44		4		18	67
Poliomyelitis				1				2		3
Scarlet fever		18	3	227	389	97	37	54	24	849
Smallpox								2		2
Trachoma									1	1
Tuberculosis	7	39	15	162	75	38	43	3	40	422
Typhoid fever				56	7	6	7	1		77
Undulant fever				1	6	1				8
Whooping cough		25	13	139	234	12	35	12	130	600

ITALY

Communicable diseases—4 weeks ended March 1, 1936.—During the 4 weeks ended March 1, 1936, cases of certain communicable diseases were reported in Italy as follows:

Disease	Feb. 3-9		Feb. 10-16		Feb. 17-23		Feb. 24-Mar. 1	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	8	8	10	10	8	7	16	16
Cerebrospinal meningitis	11	8	12	11	16	15	28	23
Chicken pox	309	120	343	124	316	125	346	185
Diphtheria and croup	609	313	484	258	480	259	462	262
Dysentery	6	6	3	3	4	4	3	3
Hookworm disease	4	3	8	5	3	1	3	3
Lethargic encephalitis	2	2	1	1	2	2		
Measles	1,583	257	1,486	244	1,848	280	1,573	253
Paratyphoid fever	29	24	19	19	31	26	38	32
Poliomyelitis	5	5	11	10	9	8	10	9
Puerperal fever	50	41	47	43	40	35	42	37
Rabies	1	1						
Scarlet fever	259	115	269	119	295	135	281	129
Typhoid fever	250	152	190	121	183	116	187	126
Undulant fever	40	24	40	31	47	29	34	27
Whooping cough	240	101	275	90	324	110	477	115

MEXICO

Mexico—Torreon—Cerebrospinal meningitis.—According to information dated May 6, 1936, 18 cases of cerebrospinal meningitis with 9 deaths were reported during the month of April 1936, and 2 deaths from the same disease occurred during the period May 1–3, 1936, in Torreon, Mexico.

61537°—36——3

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases, D, deaths, P, present]

Place		Sept 29–Oct 26, 1935	Oct 27–Nov 30, 1935	Dec 1–28 1935	Dec 29, 1935–Jan 25 1936	Week ended— February 1936: 1	8	15	22	29	March 1936: 7	14	21	28	April 1936: 4	11	18	25
Ceylon																		
Batticaloa.[1]																		
Provinces	C															14	4	
India	C	29 882	25 638	11 615	14,233	2,967	2,891	2,606	2,450	2,815	2 995	3 799	4 206					
	D	15,039	13,350	6,169	7 799	1 653	1,496	1 389	1,233	1,412	1,449	1,792	2 064					
Assam	C	164	658	707	318	35		21	21	15	5	1[illegible]	8	31	20	19	45	53
	D	79	356	396	167	19		11	7	9	4	7	5	14	12	4	22	27
Bombay Presidency	C	3,318	1 892	941	459	141	63	54	35	39	16	41	35	38	40			
	D	1,510	877	445	237	58	31	25	10	25	9	15	21	10	14			
Bombay	C		[2] 1															
Calcutta	C	90	144	103	140	47	58	61	79	135	227	188	179	208	245	171	230	18[illegible]
Central Provinces and Berar	C	5,775	1,350	98	14			8	18	30	26	45	52	94	122	102	49	84
Chittagong	C		1															
Cochin	D	9																
Madras Presidency	C	4,648	5,280	2,855	3 870	387	486	131	953	920	902	861	593	390				
	D	2,114	2,527	1,336	2,013	212	236	68	496	395	429	421	281	209				
Madras	C	8	12	13	9	11	28	18	3	10	5	4	12	5	1	2	1	1
	D	1	4	7	3	6	6	8	4	2	3	3	5				1	
Moulmein	C								1	1	5	1	1	3	1		1	
Negapatam	C			7	22	2	14	5	18	17	2		4		1	1		
	D			4	8		6	9	7	5	2							
Northwest Frontier Province	C	12			1		1											
	D	11																
Punjab	C	154	24	7	3 1											1	1	4
Rangoon	C		[1] 1		[2] 1											4		
India (French)																		
Chandernagor	C				8	1	1	1	3									
Karikal	C	4	12															
Pondichery	C	16	5															
Indochina (see also table below) Pnom-Penh	C	1																
Siam:																		
Ang Thoang Province	C	10	8				1	1	1		4	1	1		6	1		
	D	9	3				1	1	1		3	1			2	1		
Ayudhaya Province	C	30	25	40	74	31	46	48	53	36	40	14	23	24	1	5		
	D	25	16	35	49	27	28	35	41	28	25	9	18	17	4	4		

Bangkok	C	44	77	49	124	31	82	96	91	75	48	52	30	18	18	11	17	13
Bejrpuri Province	C	14	3		56	19	9	15	13	10	4	3	10	25	14	18		
Bichitr Province	C										P	6	11	3	23	11		
Bisnulok Province	C								1	12	14	35	25	32	14	4		
Chandapuri Province	C													15		4		
Chhaxoengsao Province	C			55	175	51	23	11	8	2	5	2	2	12	4	1		
Jalapuri Province	C			3	20		9	1		2		1	7	1	5			
Jayanad Province	C									13	1	4	2	4				
Kanchanapuri Province	C												2	9	8	1		
Lobpuri Province	C			10			2	3	1	1	2							
Nagara Nayok Province	C						2	5		3								
Nagara Pathom Province	C	11	25	1	4				4	7	1	6	17	19	6	17		
Nagara Rajsima Province	C						1	1										
Nagara Svarga Province	C						7	6	1	1	1	1	23	17	24	3		
Nondpuri Province	C	8	19	3	7		12	2	2	5	16	2	2	3	3	2		
Prachinpuri Province	C		14	54	26	4						3			1			
Prachuabgirikhand Province	C															14		
Pradhumdhani Province	C	6	2	1	4	14	5	7	3	12	18	3				1		
Prae Province	C												3					
Rajpuri Province	C	18	36	54	63	5	3	1		7	6	7	14	16	13	14		
Sarapuri Province	C	6	17		2	15	41	27	16	5	7	1	1					
Singhapuri Province	C	11	15	2	1				1									
Smudprakar Province	C	5	6	49	15	25	48	27	20	36	20	45	46	27	5	30		
Smudsagara Province	C	9	7	36	58	14	17	25	9	11	30	19	23	8	10	5		
Smudsongram Province	C	23	34	38	49	14	12	21	20	17	20	36	32	24	27	10		
Subarnpuri Province	C		18					4	6	3	4	24	4	16	14	12		
Upala Rajdhani Province	C										P	33	2					
Uttradhani Province	C													12				
Utradith Province	C											3	2		3	10		
On vessels:																		
S. S. *Eyre* at Rangoon	C				1													
S. S. *Floristan* at Masulipatam	C				[3] 1													
S. S. *Chetala* at Rangoon from Chittagong	C													1				
S.S. *Kutsang* at Penang from Calcutta	C															1		

Place		November 1935			December 1935			January 1936			February 1936			March 1936		
		1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-29	1-10	11-20	21-31
Indochina (French) (see also table above):																
Cambodia [4]	C			1				1		1	4	7		4	4	3
	D							1		1	3	1		4	3	3
Cochinchina [4]	C		1	1		2	1			2	2		3	3	4	1
	D		1			2	1			2	2		3	3	4	1

[1] According to information dated Apr. 8, 1936, 31 cases of cholera with 27 deaths have occurred in the vicinity of Batticaloa, Ceylon.
[2] Imported.
[3] Suspected.
[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE [1]

[C indicates cases; D, deaths; P, present]

Place		Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Week ended— February 1936					March 1936				April 1936			
						1	8	15	22	29	7	14	21	28	4	11	18	25
Algeria: Philippeville	C	3																
Argentina (see also table below):																		
Bahia Blanca (vicinity of)	C									2								
	D									2								
Azores. (See table below.)																		
Basutoland	C									[2] 2								
Belgian Congo	C	1																
Plague-infected rats		3																
Brazil (see also table below): Piauhy State	C	4																
British East Africa:																		
Kenya	C	10	7	25	10	4	4	3	5	6		2	2	5	7	3		
Tanganyika	C				7			1	1		5							
Uganda	C	206	281	61	44	6	8	3	8	19	14	14	18	16	9	8		
	D	188	231	54	40	5	8	3	8	18	13	14	15	16	9	8		
Ceylon:																		
Anuradhapura	C												1					
Balapitiya	C		1															
Colombo	C	6	5	11	10	1		2	2	1	1			2	1	1	1	
	D	6	4	10	9	1		2			1			2	1	1	1	
Plague-infected rats		4	27	4						2	2	1			2		1	5
Manar	C																1	
Ratnapura	C	1																
Tellijjawila	C	1																
Weligama	C															1		
China: Manchuria [3]																		
Dutch East Indies: West Java	C	769	985	878	726	194	183	207										
	D	769	980	873	723	192	183	204										
Ecuador:																		
Daule [4]	C												1					
Duran	C	1																
Guayaquil	C	35	48	20	8		2	1	2	1		1			1			
	D	15	16	4	6	1	2								1			
Plague-infected rats		8	12	5	2						1							
Nobol	C	1																

Egypt:																		
Alexandria: Plague-infected rats		P	P	P	P		P		P		P		P		P			
Asyut Province	C		1	3	6	3	1	2	1	2	1	1	4	7	4	5	7	3
Girga Province	C				1	1			1					1	1			
Minya Province	C								2	2		1	4					1
Qena Province	C	1																
Great Britian—England—Liverpool:																		
Plague-infected rats				2														
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district:																		
Hamakua Mill			1	1					1									
Kukaiau		1	2	1														
Paauhau [5]		2			1													
Pohakea Sector								1							1	1	2	
India	C	2,635	3,131	1,852	2,168	661	545	761	639	776	591	1,168	1,061	723				
	D	1,228	1,019	928	1,144	267	349	328	379	403	367	483	426	393				
Bassein	C	1		1			3	1	3		1	2	1		3		1	1
Plague-infected rats			1					1		1								
Bombay Presidency	C	363	148	88	99	15	28	39	38	51	17	36	47	25	9			
	D	234	93	48	61	17	20	15	24	34	8	23	24	15	6			
Bombay	C				[6] 1													
Central Provinces and Berar	C	464	1,651	716	194	28	75	165	150	166			345	111	181	135	79	93
Karachi	C											5						
Madras Presidency	C	121	133	71	42				12	17	16	11	4	13				
	D	73	88	51	26				6	5	14	8	6	10				
Punjab	C		48			1					7	2	3	2	8	22	54	11
	D		21								3	2		2	4	16	28	5
Rangoon	C	1		[6] 1				[6] 1										
Plague-infected rats		1		1		1	1		1	2		2						
Indochina (see also table below):																		
Pnom-Penh	C				1					1								
Saigon-Cholon	C				1													1
Tanghai	C															2		
Iraq: Baghdad	C		1		[6] 1													
Madagascar. (See table below.)																		
Malta	C																3	
	D																2	
Peru. (See table below.)																		
Senegal. (See table below.)																		
Tunisia: Tunis	C	2	1															
	D		1															
Plague-infected rats			1					2							1	1		

[1] Including plague in the United States and its possessions.
[2] Includes 1 suspected case.
[3] A report dated Oct. 28, 1935, states that up to Oct. 23, 155 deaths from plague were reported in the provinces of Kirin, Lungkiang, Fengtien, and South Hsingan, Manchuria, China. A report dated Nov. 27, 1935, stated that 23 deaths from plague had occurred in the vicinity of Koshan, and that there were about 15 cases in Harbin.
[4] During the period Jan. 1 to Feb. 20, 1936, 7 cases of plague were reported at Danle and vicinity, Ecuador.
[5] During the week ended May 2, 1936, 2 rats were proved positive for plague at Paauhau Sector, Hamakua district, Hawaii Island, Hawaii Territory.
[6] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Week ended— February 1936: 1	8	15	22	29	March 1936: 7	14	21	28	April 1936: 4	11	18	25
Union of South Africa	C	18	7	7	44	[7] 91		[7] 18		[7] 35		[7] 22		[7] 19		[7] 6		
Cape Province	C			2														
Orange Free State	C		1	1														
United States: California:																		
Santa Rosa	C																1	
Ventura County: Plague-infected squirrel															1			
On vessel: S. S. *Ipanema* at Marseille	C	[8] 2																

Place		October 1935	November 1935	December 1935	January 1936	February 1936	March 1936
Argentina (see also table above):							
Buenos Aires Province	C					2	
Cordoba Province	C			5	1		
Santa Fe	C				1		
Azores	C	2	2	2	3		
Basutoland	C			16			
Brazil:							
Bahia State	C	3	7	20			
Ceara State	C					7	54
Pernambuco State	C						[9] 15
Indochina (see also table above):							
Cambodia	C				1	2	1
Cochinchina	C		1		1		
Madagascar (central region)	C	293	345	507	503	382	
	D	282	333	485	485	358	
Peru	C	1	14	9	23	19	10
Arequipa Department	C				5		
Catamarca Department	C		13				
Lambayeque Department	C			1	4	3	
Libertad Department	C	1	1		5	1	1
Lima Department	C		10	7	9	8	3
Callao	C				1	2	4
	D				1	2	1
Piura Department	C					5	
Trujillo Department	C						2
Senegal:							
Dakar [10]	C				1	1	
	D				1	1	
Tivouane [10]	C	1	1	1			

[7] For 2 weeks.
[8] One of these cases was a member of the crew and the other was believed to have worked on the vessel. Several plague-infected rats were reported found on board the vessel.
[9] From Jan. 1 to Mar. 16, 1936.
[10] Incomplete reports.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Week ended—												
						February 1936					March 1936				April 1936			
						1	8	15	22	29	7	14	21	28	4	11	18	25
Algeria: Algiers Department	C							1	1									
Argentina (see also table below):																		
Corrientes Province	C													5				
Jujuy Province	C													7				
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
British East Africa:																		
Tanganyika	C	6	18		9	6		2					28	19				
Uganda	C				10	1	1	3		7	4	2	1					
British Somaliland	C	4	3	7	4		31		3									
British South Africa: Southern Rhodesia	C	1						1										
Canada:																		
Alberta	C		[1] 1		[1] 1				1	2	4	18	5	3	1			
British Columbia	C	[1] 1	[1] 1	2	2						[1] 1							
Saskatchewan	C	[1] 3	[1] 1															
Ceylon: Colombo	C				1													
China:																		
Amoy	C								2	1								1
Canton	C														1			
Dairen	C						3	1										
Foochow	C	P	P	P	P		P		P		P		P				P	
Hangchow	C			[illegible]	3	1	2		11	1	5		1	2	2			
Hankow	C					1	1	1		1			1					
Hong Kong	C		2								2	1	2	1	4	2	1	
Nanking	C		26	43	16	8	11	10	9	3	4	6	14	14	21			
Shanghai	C	2	4	6	5	4	2	9	5	10	7	6	7	3	15	9	17	9
Swatow	C		3	1					1	1	1				2	2		
Tientsin	C			3							2							
Chosen. (See table below.)																		
Colombia (see also table below)	C		44	32	68		[1] 13					[2] 78		10				
Bogota	C		8	3														
Dahomey. (See table below.)																		
Dutch East Indies: Palembang	C										1							
Ecuador. (See table below.)																		
Egypt: Provinces	C							2			5							
Eritrea	C	7						1					5				2	
Asmara	C	4															1	
France. (See table below.)																		
Great Britain: London and Great Towns.[3]																		
Greece: Salonika	C		4		6	2	3	3	3	3	5	5	5	5	5	5	5	

[1] For 2 weeks. [2] For 3 weeks. [3] During the week ended May 2, 1936, 3 cases of smallpox were reported in London and Great Towns, Great Britain.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Week ended— February 1936: 1	8	15	22	29	March 1936: 7	14	21	28	April 1936: 4	11	18	25
Guatemala. (See table below.)																		
Honduras: Tela	C	2																
India	C	4,147	8,642	9,617	19,883	5,660	6,951	6,830	7,562	7,352	6,407	7,841	8,353	8,711				
	D	865	1,762	2,106	4,220	1,387	1,592	1,641	1,853	1,944	1,585	1,818	2,068	2,208				
Assam	C	10	17	168	116	303	59	130	164	142	85	84	64	88	57	60	32	70
Bassein	C				[4] 1													
Bombay Presidency	C	487	635	741	1,708	504	662	713	801	764	730	627	754	700	741			
	D	65	90	103	282	104	111	122	165	148	158	139	134	125	104			
Bombay	C	11	21	30	86	38	46	47	72	63	54	64	78	81	87	104	74	57
	D	4	12	21	49	19	27	21	46	36	34	37	48	43	46	65	45	39
Calcutta	C	13	19	88	270	223	270	309	378	426	330	464		511	563	383	288	318
	D	5	12	56	133	131	180	24	258	300	272	312		361	425	310	217	214
Central Provinces and Berar	C	380	475	808	1,266	415	965	502	280	490	479	549	541	540	461	913	561	891
Chittagong	D				1				1									1
Cochin	C	5	1			6			8	7	2		5					
Karachi	C	2	3	11	17	8	10	16	26	17	12	5	6	5	13	7	11	5
Madras Presidency	C	1,664	1,811	1,366	1,312			96	557	561	458	555	439	528				
	D	339	324	269	176			23	82	86	75	85	56	78				
Madras	C	1	7	5	3		1		1	1		4	7	1			1	
Moulmein	C		2	6	27	16		17	13	15	26	22	20	15	12	9	7	7
Negapatam	C	2			3		1	1							1	2		
Northwest Frontier Province	C		9	7	26	6	5	5	29	5		1			3		16	2
Punjab	C	99	336	313	498	116	111	173	183	58	92	140	100	105	53	83	135	101
Rangoon	C	1	[4] 1	4	9	[4] 1	1	3	4	1	2	7	5	2	8	5	3	4
Sind State	C															21	43	26
Tuticorin	C	11	3	5														
Vizagapatam	C	18	6	9	36	12	9	2	4	12	1	2	11	5		1	1	
India (French):																		
Chandernagor	C	4	44															
Karikal	C	25	1															
Pondichery	C	11	3															
	D	8	3		7													
Indochina (see also table below):																		
Haiphong	C									1								
Tourane	C												1					1
Iran	C	19	3	12	9	12						1						
Teheran	C	3																
	D	1																

Iraq	C	11	8	36	58	7	9	4	18	2	5	1	1	2	2	4	2	2
Baghdad	C		2		1										1			
Basra	C	1	1														2	
Italian Somaliland	C		2															
Japan:																		
Kobe	C														1			
Moji	C									1								
Nagasaki	C																1	
Osaka	C												1					
Yamaguchi Prefecture	C				1													
Libya: Tripolitania	C				2													
Mexico (see also table below):																		
Chihuahua	C		1		1					1					2			
Guadalajara	D	1	9	16	13	8	9		14	15	14	13	6	6	9	13	8	3
Mazatlan	C		1			1					1	1						
Mexico, D. F.	C	3	12	5	4	3	5	2		1	3	3	5	1				
Monterrey	C	1	1							2	2							1
San Luis Potosi	D											1						
Torreon	C		5	1	1							1		1				
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	289	146	427	84	265		[1] 252	32		[1] 798							
Niger Territory. (See table below.)																		
Nyasaland. (See table below.)																		
Oman: Sharjah and Pirate Coast	C				875				[5] 70					[6] 46				
Peru. (See table below.)																		
Poland	C		1				1											
Portugal (see also table below): Lisbon	C	3	5	8	3	1		1		3	1		1	3		1	1	1
Portuguese East Africa. (See table below.)																		
Salvador. (See table below.)																		
Saudi Arabia	C		4							8								
Sierra Leone	C	110	222	116	87	[1] 41		[1] 67		[1] 27		[1] 211						
Freetown	C	7		2				[1] 1										
Spain	C	7	1	1	20			1	4	7	1	2	5	7	10		2	
Sudan (Anglo-Egyptian)	C		2		3			2	1	2	12				2		1	3
Syria: Tripoli	C	1																
Turkey. (See table below.)																		
nion of Soviet Socialist Republics. (See table below.)																		
ruguay. (See table below.)																		

[1] For 2 weeks. [4] Imported. [5] For 4 weeks. [6] For 5 weeks.

On vessels:
- S. S. *Ethiopia* at Rangoon from Madras — 1 case — Oct. 4, 1935
- S. S. *Ekma* at Rangoon from Calcutta — 1 case — Dec. 10, 1935
- S. S. *Cape St. Francis* at Rangoon from Calcutta — 1 case — Dec. 17, 1935
- S. S. *Bankura* at Karachi — 1 case — Jan. 4, 1936
- S. S. *Jalgopal* at Rangoon from Aracan — 1 case — Jan. 5, 1936
- S. S. *Matua* at Suez from Calcutta — 1 case — Jan. 21, 1936
- S. S. *Khosrou* at Kamaran quarantine station — 1 case — Feb. 15, 1936
- S. S. *Karapara* at Rangoon from Calcutta — 1 case — Mar. 9, 1936

On vessels—Continued.
- S. S. *Egra* at Calcutta — 1 case — Mar. 10, 1936
- S. S. *City of Auckland* at Rangoon from Calcutta — 2 cases — Mar. 15, 1936
- S. S. *Khandalla* at Rangoon from Calcutta — 1 case — Mar. 16, 1936
- S. S. *Haisheng* at Rangoon — 1 case — Mar. 18, 1936
- S. S. *Cranfield* at Madras from Calcutta — 1 case — Mar. 27, 1936
- S. S. *Hokuryo Maru* at Moji from Tientsin — 1 case — Apr. 2, 1936
- S. S. *City of Adelaide* at Colachel from Rangoon — 1 case — Apr. 12, 1936
- S. S. *Manipura* at Port Sudan from Calcutta — 1 case — Apr. 28, 1936

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		October 1935	November 1935	December 1935	January 1936	February 1936	March 1936
Argentina:							
Buenos Aires Province	C					4	
Entre Rios Province	C					5	1
Belgian Congo	C	248		54	456	227	
Bolivia	C	23	38	43	48	18	62
China: Manchuria—Harbin	C	1		1	1	3	
Chosen	C	53	53	53	86		
Colombia:							
Barranquilla	D					1	1
Santa Marta	D					1	
Dahomey	C		31	11		18	
Ecuador: Guayaquil	C					1	
France	C	16	7	18	76	24	30
Guatemala	C		1		2	14	2
Indochina (see also table above)	C	98	66	44	57	229	196
	D	12	10	3	3	31	15
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C					5	
Chiapas State	C				1		
Coahuila State—Torreon	C					1	
Colima State	C					1	
Guanajuato State	C				5		
Leon	C				1		
Jalisco State	C				109		
	D				28		

Place		October 1935	November 1935	December 1935	January 1936	February 1936	March 1936
Mexico—Continued.							
Guadalajara	C				85	115	
	D				24	50	
Lower California	C					7	
Mexico State	C					2	
Mexico, D. F.	C				10	22	
Mexico City	C				9		
Puebla State	C				2	9	
Puebla	C					8	
Sonora State	C					1	
Tamaulipas State	C				8		
Morocco	C				9	1	2
Mozambique	C	15	1		3	1	
Niger Territory	C	127		43			
Nyasaland	C	24	19		3		
Peru	C		7		31	7	
Portugal (see also table above)	C	154	103	74	103		
	D	34	26	11	6		
Portuguese East Africa	C				3		
Salvador	C		36	12	32	46	13
Turkey	C	1			5	6	
Union of Soviet Socialist Republics	C	44					
Uruguay	C				3		

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Week ended— January 1936: 4	11	18	25	February 1936: 1	8	15	22	29	March 1936: 7	14	21	28	April 1936: 4	11	18
Algeria:																				
Algiers Department	C	1	1				1	3	3	6		15	7	7		53	4	31	26	15
Algiers	C				1															
Constantine Department	C	5	1		3	18		4	5	24	10	10	11		10	24	15	22	16	6
Bone	C					1														
Constantine	C	1			2	1									1					
Oran Department	C							7			50	[illegible]	1		12			4	12	1
Australia: Sydney	C		2					1												
Belgian Congo	C	1																		
Bolivia. (See table below.)																				
Bulgaria	C						9	5	5	6								16	14	
Chile	C	473	691										[1] 430							
Concepcion	C	21																		
Santiago [2]	C	333																		
Valparaiso	C	26	56	37	3	2		7	6	8	5	6	4	2	1	2	3	1	4	6
China:																				
Canton	C		2																	
Hankow	C	3	1														1			
Nanking	C		1																	
Shanghai	C			3																
South Manchuria Railway Zone	C		4																	
Tientsin	C		1									1		1						
Tsingtao	C			3						1							1			
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C			1		1								2	3	1	2			1
Asyut Province	C	1	1							5	2				1		1	1		
Beheira Province	C	10	11	12		22		6	14	16	52			33	31		39	49		
Cairo	C							1	3	3		3	2			1		3		2
Dakahliya Province	C							1		10	25			4	3		7	6		
Faiyum Province	C		1																	
Gharbiya Province	C		1			6		40	26	36	16			49	37		45	23		
Girga Province	C		1					1										1		
Minufiya Province	C									26	4			9	2		7			

[1] For 5 weeks.
[2] A report dated Jan. 20, 1936, states that there were 305 cases of typhus fever with 58 deaths in Santiago Province, Chile, from Nov. 2-16, 1936.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Week ended— January 1936: 4	11	18	25	February 1936: 1	8	15	22	29	March 1936: 7	14	21	28	April 1936: 4	11	18
Egypt—Continued.																				
Port Said.[3]																				
Qena Province	C		1							2	1			1			24	20		
Sharkiya Province	C							1	1					1	11		1			
Suez	C		1																	
Provinces	C	14	26	41	49	35		54	44		103	126	98	86	153	133		119	150	153
Greece (see also table below): Salonika	C		1	4	1		1	1	1	2	2	2	2	6	6	6	6	1	1	1
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C	6	1	1											1	4	2			
Hungary	C					3										7		2	2	
Iran	C	5	7	2	2	4	5	6	3			4	2		3	2	4	7	8	7
Teheran	C	2			1									1	1	1	1	2	2	6
Iraq	C			17		19														
Irish Free State:																				
Mayo County	C																		2	
Waterford County—Youghal District No. 2	C	1																		
Japan	C					1														
Lithuania	C		19		12		[4] 57			9				6			[4] 7		[4] 8	
Mexico (see also table below):																				
Mexico, D. F.	C	50	60	68	9	26			12	14	21		24	9	9	9	15			
San Luis Potosi	D												1							
Morocco (see also table below)	C	1	8	12	2	2	2	33	7	11	1	9	9			3	2	4	1	29
Palestine: Haifa	C	8	11		[3] 2			1		1	1							1		
Panama Canal Zone. (See table below.)																				
Peru. (See table below.)																				
Poland	C	109	159	230	55	96	100	131	101	153	121	150	146	126	153	144	196	134	129	113
	D	4	8	22	6	6	6	6	16	7	6	11	8	6	6	16	11	2	11	9
Portugal (see also table below): Oporto	C														1					
Rumania. (See table below.)																				
Straits Settlements: Singapore	C	1	1	2	1	1	1								1	1				
Syria: Beirut	C											[4] 2								
Trans-Jordan	C	2					3	3	5	4	1		1	2			4	5	5	

Tunisia:																				
Tunis	C	2	1	1			3	2							3	1	5	1	1	1
Provinces	C	13	6	31	12	34	10	5	20	4	9	22	9	14	30	45	49	14	37	28
Turkey. (See table below.)																				
Union of Soviet Socialist Republics. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				

Place		October 1935	November 1935	December 1935	January 1936	February 1936	March 1936
Bolivia	C	88	134	168	135	115	110
China: Manchuria—Harbin	C	1	3		1	5	9
Chosen	C	20	30	50	51		
Czechoslovakia	C	12			14	25	219
Finland [6]	C						5
Greece	C	6	4	9	5	7	
Guatemala	C	18	26	7	9	17	6
Latvia	C						5
Mexico: [5]							
Aguascalientes State: Aguascalientes	C					5	
Durango State	C					1	
Guanajuato State	C				15		
Leon	C				7	16	
Mexico State	C					2	
	D					3	
Mexico, D. F.	C				80	73	
Mexico City	C				75		
	D				22		
Oaxaca State	C				1	2	
Puebla State	C				1		
Mexico—Continued.							
Puebla	C					2	
Queretaro State	C				3		
San Luis Potosi State: San Luis Potosi	C				8	6	
Morocco	C	8		13	45	30	7
Panama Canal Zone	C	5	1	1	2	1	1
Peru	C	16			143	108	
Portugal	C	2			1	1	
Rumania	C	37	92	210	572	905	
Turkey	C	13	18	35	33	51	
Istanbul	C				5	4	4
Union of Soviet Socialist Republics	C	2,823					
Union of South Africa:							
Cape Province	C	66	79	76	36	57	
Natal	C		6	1	7	2	
Orange Free State	C	23	18	4	17	21	
Transvaal	C	2	25	12	1	13	
Yugoslavia	C	6	10		131	80	

[3] For the week ended May 16, 1936, 1 case of typhus fever was reported at Port Said, Egypt.
[4] For 2 weeks.
[5] Imported.
[6] For the period Apr. 1–15, 1936, 73 cases of typhus fever were reported in Finland

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Sept. 29–Oct. 26, 1935	Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Week ended— January 1936				February 1936					March 1936				April 1936		
					4	11	18	25	1	8	15	22	29	7	14	21	28	4	11	18
Bolivia: Santa Cruz Department.[1]																				
Brazil:[2]																				
Bahia State	C			1	2															
Matto Grosso State	C			1			1		1				1	1					1	
Minas Geraes State	C			10	3	1	4		2	3	4		2	1		4	2		1	1
	D			5	3	1	4		2	3	4		2	1		4	2		1	1
Para State	C	1																		
Parana State[2]	C										1	4	4	1	7	5	6	1	2	
Sao Paulo State[2]	C			11	1		3			2	2	3	16	17	5	7	6	[3] 1		
Colombia:																				
Boyaca Department	C											3								
Intendencia of Meta	C											3								
Acacias	C		2																	
Restrepo	C		2																	
Gold Coast:																				
Bawku	C	3																		
Koforidua	C																			1
Kumasi	C												1				1			
Neprawase	C																		1	
Ivory Coast:																				
Abidjan	C		1																	
Sassandra	C		1																	
Vavua	C																	1		
Niger Territory: Fada N'Gourma	C																			1
Senegal:																				
Dakar	C			[4] 1																
M'Bake	C			1																
Sudan (French): Koutiala	C	1	1																	

[1] Yellow fever has been reported in Bolivia as follows: For the month of February, 2 cases; March, 10 cases.

[2] Yellow fever has also been reported in Brazil as follows: Parana State, Feb 16–25, 1936, 5 cases, 5 deaths; Sao Paulo State, no date given, 3 cases and 4 deaths, Mar. 24–31, 1936, 2 cases, 2 deaths, May 2, 1936, 1 case, 1 death.

[3] This case occured in the city of Sao Paulo, Sao Paulo State, Brazil.

[4] Suspected.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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the 2 preceding years, and in the West North Central region the incidence was almost 4 times that of 1935 and 1934. While the number of cases (1,211) in the Mountain and Pacific regions was not large, it was about 3 times that for any corresponding period in the 8 years for which these data are available. In the Atlantic Coast and East North Central regions the incidence during the current 4-week period was not far from the seasonal expectancy. While the weekly incidence was fluctuating considerably, the total number of cases in each area for the current period was considerably below that for the preceding 4-week period.

Meningococcus meningitis.—For the 4 weeks ended May 16 there were 912 cases of meningococcus meningitis reported, as compared with 1,169 for the preceding 4-week period. In all sections of the country the disease declined according to the seasonal expectancy. For the country as a whole, the current incidence was about 1.3 times that for the corresponding period in 1935 and more than 4 times the incidence in each of the years 1934 and 1933; it was the highest incidence for any corresponding period since 1929, when 1,166 cases were reported.

A situation similar to that described for the country as a whole existed in the New England and Middle Atlantic region, while in the South Atlantic and South Central regions the number of cases (211 and 217, respectively) exceeded that of 1929 and was the highest in the 8 years for which these data are available. The North Central regions reported appreciable decreases from last year's figure, and in the Mountain and Pacific regions the incidence was practically the same as that of last year.

States showing considerable increases over last year were Tennessee (122 cases), Maryland (53), Pennsylvania (50), New Jersey (28), Texas (26), North Carolina (22), Florida and South Carolina (16 each). In each of these States, however, the current figure was considerably below that for the preceding 4 weeks, and a still further decline may be expected.

Scarlet fever.—The incidence of scarlet fever continued to decline, with 26,142 cases reported for the 4 weeks ended May 16. As compared with recent years, the current incidence was slightly below that for 1935, when 27,281 cases were reported for this period, but it remained well above the incidence in the 6 preceding years. For the first time since the beginning of 1935 the number of cases has fallen as much as 6 percent below the incidence for a corresponding period in the preceding year.

The number of cases (5,180) reported from the West North Central States was about 1.7 times the number reported for this period in 1935 and more than 3 times the number in each of the 3 preceding years; the number from the South Central regions (722) was almost 1.5

times that of last year, and in the Mountain and Pacific regions the increase was about 15 percent. In the New England and Middle Atlantic, East North Central, and South Atlantic regions the incidence fell considerably below that of last year. As compared with earlier years the incidence in the West North Central and Mountain and Pacific regions was the highest in the 8 years for which data are available; in the New England and Middle Atlantic regions the number of cases was considerably below the average for the years 1929–34, inclusive, while in the East North Central States the incidence was about 20 percent above the average for those years. In the South Atlantic States the incidence stood at about the seasonal expectancy.

Typhoid fever.—For the 4 weeks ended May 16 the number of cases of typhoid fever totaled 532, as compared with 629, 843, and 706 for the corresponding period in the years 1935, 1934, and 1933, respectively. The New England and Middle Atlantic and East North Central regions reported increases over 1935, the Mountain and Pacific regions approximately the same incidence, the West North Central and South Central regions about a 50 percent decrease, and the South Atlantic States almost a 25 percent decrease. For the country as whole, as well as for the West North Central, South Atlantic, and South Central regions, the current incidence was the lowest for this period in 8 years. New York, with 52 cases, and Pennsylvania, with 57 cases, seemed mostly responsible for the excess over last year in the New England and Middle Atlantic region, while Ohio, with 40 cases, and Michigan, with 21, placed the incidence in the East North Central region about 35 percent above that of last year.

Measles.—The number of cases of measles (52,581) reported for the current 4-week period was only about 40 percent of the number reported for the corresponding period in each of the years 1935 and 1934; both of these years, however, were unusually high "measles years." A comparison with the more normal years preceding those two shows that the current incidence was considerably below the seasonal expectancy. In the East North Central regions, where the disease has been unusually prevalent, the number of cases (2,812) was only about 10 percent of the average for the years 1929–33, inclusive. In the West North Central region the number (2,248) was less than half of the average for the same period. The disease still remained quite prevalent in the Mountain and Pacific regions. The current incidence (12,190 cases) did not quite reach the high peak of 1935, but it was considerably higher than in preceding years. In the South Atlantic and South Central regions the incidence was relatively low, while in the New England and Middle Atlantic it was about normal.

Diphtheria.—The total number of diphtheria cases reported for the 4 weeks ended May 16 was 1,649, or about 80 percent of the number for the corresponding period in each of the 3 preceding years. For

this period the number of cases in the South Atlantic region was about 10 percent above last year's figure, in the New England and Middle Atlantic region the number (426) closely approximated that of last year, while in all other regions the disease was considerably less prevalent. During the 8 years for which these data are available, diphtheria has gradually declined until the incidence for the current year for the country as a whole has been only about 35 percent of that for the corresponding period in 1929. For the 4-week period in that year corresponding to the one under report, 5,646 cases were reported.

Smallpox.—For the 4 weeks ended May 16 there were 956 cases of smallpox reported. Of the total, Iowa reported 170, Kansas 128, South Dakota 102, Oregon 100, Nebraska 76, Missouri 56, Montana 42, Wyoming 38, Colorado and Wisconsin 29 each, and most of the remaining cases were distributed among the other States in the same geographic regions in which the States mentioned are located. Only 2 cases were reported from the South Atlantic States, 19 from the South Central groups, and none from the New England and Middle Atlantic. For the entire reporting area the current incidence was the highest for any corresponding period in 4 years.

Poliomyelitis.—The incidence of poliomyelitis (64 cases) increased about 35 percent during the current period over the preceding 4-week period. The cases were widely distributed throughout the various geographic regions. California reported 12 cases, Massachusetts and New York 6 cases each, and Texas 5; no more than 4 cases were reported from any other State. The current incidence for the country as a whole was the lowest for this period in the 8 years for which data are available. The New England and Middle Atlantic region reported 16 cases, as compared with 10 last year, but in all other regions the incidence either approximated that of last year or fell considerably below.

Mortality, all causes.—The average mortality from all causes in large cities as reported by the Bureau of the Census for the 4 weeks ended May 16 was 12.7 per 1,000 inhabitants (annual basis). For the corresponding period in the years 1935, 1934, and 1933, the rate was 12.1, 11.8, and 11.0 respectively. The current rate was the highest for this period since 1929, when a rate of 13.0 was reported.

SMALLPOX IMMUNITY IN 5,000 COLLEGE STUDENTS

By R. C. Bull, M. D., *Director*, and S. L. Rankin, M. D., *Assistant Director, Students Health Service, Lehigh University, Bethlehem, Pa.*

Vaccination against smallpox is widely, though not universally, practiced in the United States. The mildness of many cases of smallpox and active opposition to vaccination have tended to create

a feeling that smallpox is not a serious menace and that vaccination is of minor importance. Moreover, in the minds of many persons, one vaccination, successful or unsuccessful, gives or indicates permanent immunity to the disease. On the other hand, many articles have appeared which question the duration of immunity from a single vaccination and which indicate a considerable variation in the time that an individual remains effectively immune following vaccinia.

Scammon and Dudley report an individual relatively immune 64 years after vaccination.[1] Kellogg cites Weil (1899) as reporting 72.5 percent "successful revaccinations" after 7 years and 88.6 percent "successful vaccinations" after 10 years; Kellogg himself [2] reports 204 out of 219, or 93 percent, successful vaccinations averaging 12 years after the first vaccination on school entrance. Dearing and Rosenau report as low as 1.25 percent primary takes (counting as primary takes only those reactions which reach their height on the tenth day or later) in vaccinating over 400 medical students.[3] McCallum reports loss of immunity, as indicated by a typical Jennerian reaction on vaccination, as follows: 2.7 percent within 7 years, 7.4 percent in 7–15 years, 26.4 percent in 15–30 years, and 56.9 percent in 30 years and over.[4]

With such wide variation indicated (perhaps with vaccines of varying degrees of potency as used, and with varying methods of observing and recording the reactions) it would be of value to determine the status of immunity to smallpox, by the criterion of vaccination reactions, on a reasonably large number of the rising generation to see whether we are resting on a false sense of security. This was made possible at Lehigh University through a threat of smallpox which resulted in a regulation requiring vaccination on entrance of all students who had not been successfully vaccinated within 3 years. In our view "successful vaccination within 3 years", so far as a safe interpretation of this rule is concerned, is vaccinia. Under this ruling nearly all of the students who have matriculated at the university since 1924 have been vaccinated by the Students' Health Service. All vaccinations have been carefully observed, and the reaction (diameters in mm) was recorded daily. At first the scratch method was used, and approximately 1,000 vaccinations were performed by this method. Then the multiple pressure method was employed and found equally effective, more convenient, and more acceptable to the students.[5]

---

[1] Scammon, C L, and Dudley, O A · Bost Med & Surg Jour, *195* 538 (1926)
[2] Kellogg, Frederic S Nation's Health, *6* 591 (1924)
[3] Dearing, W P, and Rosenau, M J Jour Am Med Assoc, *102* 1998–2000 (1934)
[4] McCallum, F The Medical Officer (Lond), vol 37, no 19, May 7, 1927
[5] Thomas, Stanley, and Bull, R C Jour Am Med Assoc, *88* 1879–81 (1927)

In the 11 years since vaccination has been required, 6,821 vaccinations have been performed on 5,918 students[6] and 5,488 well read records are available. One vaccination was sufficient to supply a good record in 4,813 cases, but in 675 cases revaccination was necessary, mostly on account of missed readings. In 430 cases the students left school before a satisfactory record could be obtained.

In the following tables the "day of reaction" means the day on which the reaction reached its height, i. e., the greatest diameter of areola, counting the day after vaccination as the first day. The designation of immune reactions, vaccinoid reactions, and vaccinias is in accordance with the scheme reported by Surg. J. P. Leake of the U. S. Public Health Service.[7]

The result of the vaccination of the 4,813 students who produced a satisfactory record on the first vaccination at Lehigh is shown in table 1.

TABLE 1.—*One vaccination at college*

Day of reaction	Number	Percent	Number	Percent
1	1,232	25.60	3,384	70.31 Immune.
2	1,499	31.14		
3	653	13.57		
4	548	11.39	1,038	21.56 Vaccinoid.
5	275	5.71		
6	159	3.30		
7	56	1.16		
8+	391	8.13	391	8.13 Vaccinia.
Total	4,813	100.00	4,813	100.00

The result of the vaccination of the 675 students who had to be revaccinated to produce a satisfactory record is shown in table 2.

TABLE 2.—*Repeated college vaccination*

Day of reaction	Number	Percent	Number	Percent
1	295	43.71	557	82.52 Immune.
2	198	29.33		
3	64	9.48		
4	42	6.22	97	14.37 Vaccinoid.
5	32	4.74		
6	19	2.82		
7	4	.59		
8+	21	3.11	21	3.11 Vaccinia.
Total	675	100.00	675	100.00

It would appear that revaccination changed the picture somewhat, giving a higher percentage of immune reactions and a lower percentage of vaccinoid reactions and vaccinias. The combination of tables 1

[6] While a few faculty members and children of faculty families are included, the number of these is so small as to be negligible.

[7] Leake, James P.: Questions and answers on smallpox vaccination. Pub. Health Rept., 42: 221-238, 2798 (1927). (Reprint No. 1137; revised 1934.)

and 2 gives the end result in the 5,488 cases in which we have good records. This combined result is shown in table 3.

TABLE 3.—*Entire group*

Day of reaction	Number	Percent	Number	Percent
1	1,527	27.83	3,941	71.81 Immune.
2	1,697	30.92		
3	717	13.07		
4	590	10.75	1,135	20.68 Vaccinoid.
5	307	5.59		
6	178	3.24		
7	60	1.09		
8+	412	7.51	412	7.51 Vaccinia.
Total	5,488	100.00	5,488	100.00

Of the entire group, 4,994, or 91 percent of the total, not only gave a history of previous vaccination but showed a good definite scar as evidence of vaccinia. The results in this group are shown in table 4.

TABLE 4.—*Definite scars*

Day of reaction	Number	Percent	Number	Percent
1	1,473	29.50	3,808	76.25 Immune.
2	1,638	32.80		
3	697	13.96		
4	573	11.47	1,099	22.01 Vaccinoid.
5	294	5.89		
6	173	3.46		
7	59	1.18		
8+	87	1.74	87	1.74 Vaccinia.
Total	4,994	100.00	4,994	100.00

In 248 cases, or 4.52 percent of the total, the students gave a history of previous vaccination, and many insisted that they had had "takes", but no scar was found as supporting evidence. The results in this group are shown in table 5.

TABLE 5.—*History of previous vaccination but no scar*

Day of reaction	Number	Percent	Number	Percent
1	33	13.31	85	34.27 Immune.
2	38	15.32		
3	14	5.64		
4	14	5.64	28	11.29 Vaccinoid.
5	8	3.23		
6	5	2.02		
7	1	.40		
8+	135	54.44	135	54.44 Vaccinia.
Total	248	100.00	248	100.00

In 193 cases, or 3.52 percent of the total, the students gave a history of never having been vaccinated. Some of these objected to

vaccination, but the majority did not object when the reason for vaccination was explained to them, showing, in the instances in which there was not a forgotten immunization, that the lack of protection was due either to parental objection or to plain neglect. The results in this group are shown in table 6.

TABLE 6.—*Never vaccinated*

Day of reaction	Number	Percent	Number	Percent
1	7	3.63		
2	3	1.55	11	5.70 Immune.
3	1	.52		
4	0	0.00		
5	2	1.04	2	1.04 Vaccinoid.
6	0	0.00		
7	0	0.00		
8+	180	93.26	180	93.26 Vaccinia.
Total	193	100.00	193	100.00

In a small group of 53, or less than 1 percent of the total, there was a history of previous vaccination, but through clerical oversight the record of a scar was not entered on the card. These could not properly be included in tables 4 or 5, but probably some belonged in each. They do not belong in table 6, since each gave a history of previous vaccination. The results in this group are shown in table 7.

TABLE 7.—*History of previous vaccination but no record made as to scar*

Day of reaction	Number	Percent	Number	Percent
1	14	26.42		
2	18	33.96	37	69.81 Immune.
3	5	9.43		
4	3	5.66		
5	3	5.66	6	11.32 Vaccinoid.
6	0	0.00		
7	0	0.00		
8+	10	18.87	10	18.87 Vaccinia.
Total	53	100.00	53	100.00

In table 6 it will be noted that 13 students who gave a history of never having been vaccinated did not develop vaccinia but showed varying degrees of immunity. Of these, 1 gave a very definite history of smallpox, which undoubtedly accounts for his immunity. Five gave a history of chicken pox which, from conversation with Surg. J. P. Leake, leads us to suspect that some of these may have had mild cases of smallpox diagnosed as chicken pox, which would account for their immunity. Five definitely stated that they had never had either chicken pox or smallpox, and we cannot explain their immunity if the history of no previous immunization is correct. In 2 cases this portion of the history was not obtained.

In connection with those never vaccinated (table 6), there are 2 cases recorded in table 5 which should be considered with this group. One graduate student gave a very definite history of having had a severe case of smallpox twenty-eight years previously, when he was less than 1 year of age. He was never vaccinated until 2 years before entering Lehigh, when vaccination was required on account of crossing an international boundary. He reported that nothing happened on that vaccination, which probably means that he gave an immune reaction if the vaccine was potent. On revaccination here he showed a very definite first day immune reaction. The other student, now in school, gives a history of having had a mild case of smallpox 17 years before entering the university. At the time he had the disease he said that 40 out of 45 pupils in the school he was attending had the infection. Some of the cases were quarantined as smallpox, others as chicken pox, all being mild in nature. He had been vaccinated before the attack but got no scar, and so probably the vaccine was impotent and afforded no protection. He was revaccinated once after the attack with no result, according to his statement. On this first vaccination here he showed a very typical vaccinia, with the exception of the fact that it reached its height seven days after vaccination. Three months later he was revaccinated here and gave a first day immune reaction. This case was reported to Surg. J. P. Leake, who said that he thought it should be counted as a vaccinia accelerated by the previous attack of smallpox.[8]

Out of the total of 5,918 we have records of the geographical distribution of 5,379, representing 43 States, the District of Columbia, and 27 foreign countries. On 539 records this information is lacking. The distribution is shown in table 8.

TABLE 8.—*Geographic distribution of 5,379 students vaccinated*

Alabama	7	Louisiana	1	Oklahoma	5
Arkansas	4	Maine	4	Oregon	2
California	7	Maryland	124	Pennsylvania	2, 417
Colorado	7	Massachusetts	81	Rhode Island	14
Connecticut	119	Michigan	21	South Carolina	3
Delaware	36	Minnesota	10	Tennessee	5
District of Columbia	83	Missouri	13	Texas	13
Florida	8	Montana	3	Utah	5
Georgia	7	Nebraska	1	Vermont	3
Idaho	1	Nevada	1	Virginia	39
Illinois	34	New Hampshire	6	Washington	4
Indiana	15	New Jersey	1, 063	West Virginia	40
Iowa	3	New York	993	Wisconsin	8
Kansas	3	North Carolina	4	Wyoming	2
Kentucky	6	Ohio	94	Foreign	60

[8] Personal communication.

The relative distribution of those students who had never been vaccinated is interesting. In table 6, 193 such cases are listed. Five others falling in this group were vaccinated but their records were never completed (hence are not included in the 5,488 recorded in tables 1–7), making a total of 198 with no previous vaccination, or 3.38 percent of the 5,858 students from the United States. All foreign-born students had been vaccinated before coming to Lehigh. The geographical distribution of these students not previously vaccinated, together with the total number from each State, is shown in table 9. In this table only individual States having 30 or more students are shown, since the smaller delegations would give unreliable figures.

TABLE 9.—*Geographic distribution of those never vaccinated*

State	Number of students	Never vaccinated	
		Number	Percent
Connecticut	119	10	8.40
New Jersey	1,063	86	8.09
New York	993	50	5.04
Massachusetts	81	4	4.94
Ohio	94	3	3.19
Delaware	36	1	2.78
Virginia	39	1	2.56
West Virginia	40	1	2.50
Maryland	124	3	2.42
Pennsylvania	2,417	7	.29
District of Columbia	83	0	0.00
Illinois	34	0	0.00
Other Northeastern States	27	1	3.70
Other East North Central States	44	2	4.55
Other South Atlantic and East South Central States	40	2	5.00
Other West North Central States	30	2	6.67
Other West South Central States	23	2	8.70
Other Mountain and Pacific States	32	3	9.38
State unknown	539	20	3.71
Foreign	60	0	0.00
Total	5,918	198	

Among those students who had been previously vaccinated and whose histories contained definite statements as to the years which had elapsed since vaccinia, there is a considerable variation. This is best shown by means of a graph (figure 1). In this graph only the periods of 1 to 20 years are shown, as very few students have had vaccinia more than 20 years before coming to college; most of the faculty members fall in the latter group.

It will be noted that the largest group had been vaccinated and developed vaccinia 12 years before coming to college. This is explained by the fact that most children are vaccinated when they start in grade school and the normal period from grade school to college is 12 years. Considering the group as a whole, it can be divided readily into 3 subgroups—those from 1 to 9 years, inclusive, those from 10 to 15 years, inclusive, and those from 16 to 40 years, inclusive. The results of the vaccination in these 3 subgroups is shown in table 10.

TABLE 10.—*Years since vaccinia*

Years since vaccinated	Number	Immune reaction		Vaccinoid reaction		Vaccinia	
		Number	Percent	Number	Percent	Number	Percent
1 to 9	1,007	778	77.26	204	20.26	25	2.48
10 to 15	3,627	2,755	75.96	802	22.11	70	1.93
16 to 40	407	292	71.74	103	25.31	12	2.95

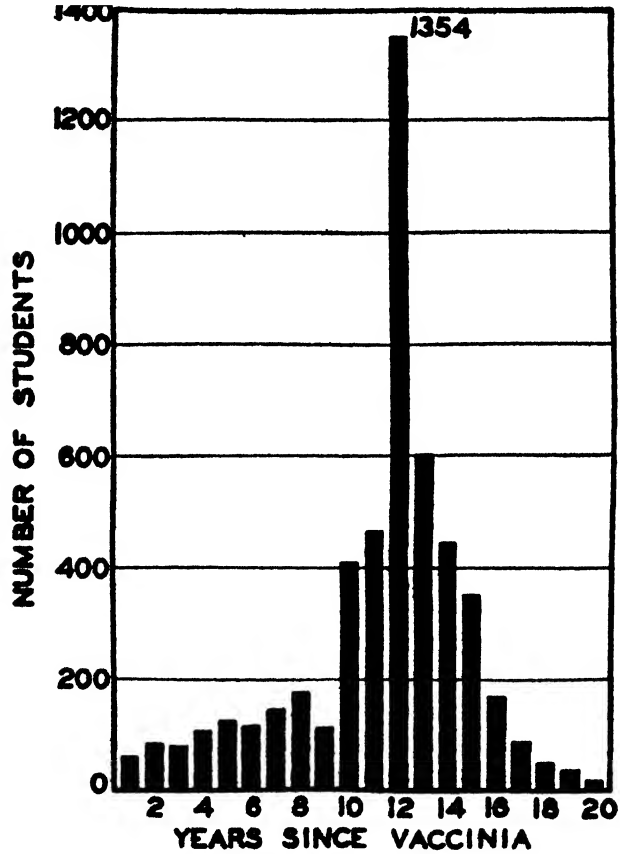

FIGURE 1.—Number of years since vaccinia.

These figures differ considerably from some reports that have been published in recent years. Muldoon reports on one group of 235 individuals who had vaccinias in 1923 and the same group showed 44 percent vaccinias on revaccination in 1928, but this author does not distinguish vaccinoid reactions. The same author reports another group of 32 individuals all of whom were "successfully vaccinated" in 1921. Seven years later, in 1928, all were revaccinated, and 88

percent again developed typical takes.[9] The official German publication on vaccination [10] states that during the years 1917–1921, 92.99 to 93.89 percent of individuals were successfully revaccinated 10 years after their primary vaccination, and that revaccination is necessary after this period. Kellogg states that 92 percent of 310 applicants for life insurance, presumably in Pittsburgh, had only one vaccination.[11] Woodward, in speaking of the epidemic of smallpox in Los Angeles during the first 4 months of 1926, states that of the 1,000 cases, with 164 deaths "not one person who had been vaccinated within 20 years died." [12] This would indicate that, while immunity may be very markedly decreased after 20 years, there is still some immunity retained in many instances. Since the largest group in our series had been vaccinated 12 years before coming to college, it is of interest to note the reactions of these 1,354 students, which are shown in table 11.

TABLE 11.—*Twelve years since vaccinia*

Day of reaction	Number	Percent	Number	Percent
1	405	29.91	1,019	75.26 Immune.
2	435	32.13		
3	179	13.22		
4	163	12.04	308	22.75 Vaccinoid.
5	89	6.57		
6	46	3.40		
7	10	.74		
8+	27	1.99	27	1.99 Vaccinia.
Total	1,354	100.00	1,354	100.00

The requirement of daily readings in the development of our records has been rather rigidly adhered to. We have insisted on consecutive daily observations, with a uniform method of measurement, until 3 days after the height of the reaction has been reached. Of the 5,488 on whom we have good records, 4,813 completed their records on one vaccination while 675 had to be revaccinated, and 870 revaccinations had to be performed on these before all records were complete. Missed readings caused the greatest number of revaccinations. Other causes for revaccination were as follows: "Insufficient reaction", "neuro vaccine" (which was tried but discarded), the multiple pressure method when it was considered in the experimental stage here and designated "new method", also "later at request", "no previous vaccinia", and a few cases where no reason can

[9] Muldoon, Mary T.: New Eng. Jour. Med., *198:* 32 (1928).
[10] Blattern und Schutzpockenimpfung. Berlin, 1925. Pp. 77, 91.
[11] Kellogg, Frederic S.: Nation's Health, *6.* 591 (1924).
[12] Woodward, S. B · Boston Med. & Surg Jour., *195:* 832 (1926).

be assigned from a study of the records. The numbers revaccinated for various reasons are shown in table 12.

TABLE 12.—*Reasons for revaccinations*

Missed readings	458	Later at request	14
Insufficient reaction	266	No previous vaccinia	13
Neuro vaccine	62		
No reason assigned	38		870
New method	19		

Of the 430 records which have been discarded as incomplete, revaccination was ordered for one of the reasons noted in table 12, but the students left school before a satisfactory record could be obtained, although 33 revaccinations were done on members of this group.

In all, 24 different operators performed 6,821 vaccinations. In this entire series we have found that approximately 4 percent of the original vaccinations were unsatisfactory because of insufficient reaction. Fourteen operators performed 100 or more vaccinations each. Table 13 shows these operators, with the number of vaccinations performed by each, the number of failures, and the percent of failures for each.

TABLE 13.—*Vaccinations and failures*

Operator	Number of vaccinations	Insufficient reactions	
		Number	Percent
a	2,454	35	1.43
b	1,271	48	3.78
c	437	17	3.89
d	413	18	4.36
e	346	4	1.16
f	336	7	2.08
g	239	7	2.93
h	198	67	33.84
i	187	25	13.37
k	131	3	2.29
l	114	8	7.02
m	112	1	.89
n	110	5	4.54
o	100	3	3.00
Subtotal	6,448	253	
10 other operators	373	13	3.48
Total	6,821	266	

It will be noted that one operator had a very high record of failures. This particular operator worked two different years. In the first year's work his record was practically the same as that of the other operators, but in the second year, for some unknown reason, his record of failures was very high. While no difference was noted in his technique during the vaccinations, we suspect that he became a little careless in applying a good firm pressure each time the needle was applied to the arm. This experience, which caused us to revaccinate nearly 60 students in one year for this reason alone, has

been a warning to us that the pressure technique must be carefully followed if satisfactory results are to be obtained.

COMMENTS

In making this survey it will be noted that we have reported on only 5,488 out of 5,918 students vaccinated. The reason for the elimination of 430 records is that they do not show definitely a result which is not subject to question. In some of the earlier vaccinations the cards show that the individuals were certified as immune, vaccinoid, or vaccinia, which may have been justified at the time, but sufficient data was not entered on the cards to enable us to draw the same conclusion from a subsequent study of the record alone. We desired that only well read vaccinations should enter into the report.

With the large numbers to be vaccinated, it was necessary to develop some scheme which would permit the handling of such numbers in a minimum amount of time. Four specially selected student clerks were used to fill out the face of the cards, with one member of the health-service staff available to supervise and check this work. The students who were to be vaccinated reported to these clerks and then, carrying their cards, passed single file and with sleeves rolled up through a door, at which point a nurse cleaned the arms with 25-percent acetone in alcohol. Each student then passed on to one of three tables at each of which was an operator and a clerk As the subject was being vaccinated, the clerk entered on the card the date of vaccination, the operator's initials, and the vaccine used, together with its serial number and date of expiration. The students then passed out of the building by a second door; no "back tracking" was permitted. The clerks retained the cards, filing them immediately after the work of the day had been completed. In this manner over 400 students were vaccinated in 2 hours. The same general scheme was followed in making the readings, the students getting their records from the file clerks and getting the readings at the same tables where they were vaccinated. No clerks were employed in recording the readings, as it was felt that greater accuracy would be obtained by having each trained observer make his own notations. In general, it required only about half as long to make the readings as it did to make the first record and vaccinate.

We used the scratch method at first, but it had many objections. Sleeves could not be rolled down until the vaccine was dry, unless some special form of dressing or protection was used, which is undesirable from many standpoints. The method was slower than the multiple pressure method. The latter method is also much more acceptable to those being vaccinated and has done much to eliminate objection on the part of the students. Many of them do not realize that they are being vaccinated, speaking of the procedure as "only

a test." While we were using the scratch method it was not unusual to have a dozen boys faint in the course of an afternoon's vaccinating, but since we have introduced the multiple pressure method fainting is a very rare occurrence.

In making the readings we use a millimeter scale and always measure the reaction in the transverse diameter. The diameter recorded includes all of the tissue involved in the reaction; and where there are definite zones present, these are recorded with the diameter of each. Degrees of elevation, redness, and vesiculation are also roughly indicated by the very ingenious "shorthand" system developed by von Pirquet and modified by Force and Leake, but the diameter of the tissue involved in the reaction is the criterion used in determining the type of reaction.

Exceptional support by the administrative officers of the university has made it possible for us to vaccinate practically every student who has entered the university in the past 11 years. A few students, on seeing the rule in the catalog, have been vaccinated during the summer before entrance and have presented certificates of such vaccination. The only certificates we accept are those which are accompanied by a record of readings comparable to ours, a good and evidently very recent scar, or a vaccination actually in the process of "taking." At first many students tried by various means to escape the vaccination requirement. In recent years the objections have been less numerous and less strenuous, partly on account of the apparent ease and mildness of the pressure method and partly on account of the fact that the student body has become educated to the procedure.

We have been very careful to use good potent virus, ordering our vaccine from one of the larger manufacturers not far from Bethlehem, always requesting fresh material and storing it in an electric refrigerator. Since our order is a fairly large one, we usually get vaccine all of one lot number and from the last lot tested. We have tried vaccine from two different lots in one vaccination period, but have never been able to detect any difference in potency. One fall we tried 100 tubes of a vaccine made from rabbits' spinal cords and compared results with the regular vaccine. We were not satisfied with the reactions in most of the cases, and this accounts for the 62 revaccinations on account of "neuro vaccine."

In our series the loss of immunity has apparently not been so rapid as in some other reports. We do not wish this to be taken as an indication that we feel that revaccination is any the less necessary; quite the contrary. According to our figures, at least 1.74 percent of all who have been previously vaccinated and have definite scars have completely lost their immunity; and in the group who had their last vaccinia 12 years previously, 1.99 percent had completely lost

their immunity. Even though this may indicate a reasonable retention of immunity, it is not fair to those who have lost their protection to argue against revaccination. Had virulent smallpox appeared, the degree of protection corresponding to a vaccinoid would not have been satisfactory.

We had one individual who apparently loses his immunity rapidly, as evidenced by 4 scars each representing a vaccinia and the vaccinias spaced approximately 2 years apart. Our revaccination of this individual was 2 years following his last vaccinia and resulted in a perfectly typical "take." Similar cases might be more prominent in another series.

With the exception of the one student who had an accelerated vaccinia, due to previous smallpox, we have counted as vaccinia only those cases in which the reaction by actual measurement reached its height on the eighth day or later. Many of the cases which we recorded as vaccinoid looked like vaccinia and would have been so designated except for the record of measurements and observation of the later course of the reaction. Some of our vaccinoids left apparent scars, but they were not as definite at any time as true vaccinia scars and tended to fade out in a few months. In our experience the scar of a true vaccinia never disappears.

Whether the results obtained at Lehigh are a fair cross section of the college students of the country may be open to some question. It is a men's college and is located in the industrial section of the country. While it is probably best known as an engineering college, the enrollment in arts and business administration combined is only slightly less than that in engineering. The geographical distribution of the student body is fairly representative, though naturally the majority come from Pennsylvania, New Jersey, and New York. Still, youth is youth no matter from what part of the country it originates. We see no reason why those who have never been vaccinated should either seek or avoid Lehigh. We see no reason why Lehigh students should either retain immunity longer or lose their immunity more rapidly than others. Records gathered here, we feel, should apply with a reasonable degree of accuracy to the country at large.

CONCLUSIONS

1. Seventy-five out of each 1,000 college students are without adequate protection against smallpox. This means that 83,250 [13] students in our colleges today need to be vaccinated and the only way to find these individuals is to revaccinate all.

2. More than 33 out of each 1,000 American students starting college each year have never been vaccinated. They offer a fertile

[13] Based on enrollment of 1,110,078 college students in regular session 1931-32, estimated by Dr. Emery M. Foster, chief of statistics, Office of Education, Department of the Interior, July 30, 1935. (Personal communication.)

field for the infection of smallpox and, with no protection at all, might easily be the nucleus for an epidemic of virulent smallpox with a high mortality rate.

3. As college students are the future leaders of public opinion, we can imagine no better group to be educated in what constitutes adequate protection against smallpox. They, in turn, should disseminate this information among the public at large.

DEATHS DURING WEEK ENDED MAY 16, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 16, 1936	Corresponding week, 1935
Data from 86 large cities of the United States		
Total deaths	8,511	8,380
Deaths per 1,000 population, annual basis	11.9	11.7
Deaths under 1 year of age	586	550
Deaths under 1 year of age per 1,000 estimated live births	53	50
Deaths per 1,000 population, annual basis, first 20 weeks of year	13.4	12.6
Data from industrial insurance companies		
Policies in force	68,269,107	67,773,031
Number of death claims	13,213	14,299
Death claims per 1,000 policies in force, annual rate	10.1	11.0
Death claims per 1,000 policies, first 20 weeks of year, annual rate	10.8	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended May 23, 1936, and May 25, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 23, 1936, and May 25, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935
New England States:								
Maine	4	1	6	3	352	172	0	0
New Hampshire					69	12	0	0
Vermont					354	49	0	0
Massachusetts	6	11			1,448	378	4	2
Rhode Island	2	1			70	488	1	3
Connecticut	3	1		2	219	918	3	0
Middle Atlantic States:								
New York	35	29	[1] 1	[1] 5	3,212	2,904	19	12
New Jersey	5	23	3	6	588	2,258	4	3
Pennsylvania	42	36			1,257	2,877	15	9
East North Central States:								
Ohio	9	38	19	5	435	1,241	9	13
Indiana	13	13	29	7	10	270	5	4
Illinois	35	57	62	10	29	1,675	9	20
Michigan	9	12	2	3	104	4,316	5	3
Wisconsin	8	1	34	18	222	1,694	0	2
West North Central States:								
Minnesota	1	4	2		412	523	2	3
Iowa	2	9	1	5	8	231	1	2
Missouri	16	23	50	36	20	332	2	7
North Dakota				4	2	32	0	0
South Dakota	1	2				35	0	0
Nebraska		4			22	191	0	1
Kansas	2	3	4	1	10	656	1	3
South Atlantic States:								
Delaware		1			11	12	0	0
Maryland [2] [3]		11	5	6	216	96	7	8
District of Columbia	19	12	1		161	66	4	10
Virginia	10	15	33		111	683	9	6
West Virginia	5	8	30	35	98	357	6	1
North Carolina	9	10	4	4	19	131	6	2
South Carolina	3	1	104	119	62	12	1	0
Georgia [4]	6	10			8	26	3	0
Florida	4		4	1	19	29	0	0

See footnotes at end of table.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 23, 1936, and May 25, 1935*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935
East South Central States:								
Kentucky	9	4	30	9	37	268	18	2
Tennessee	7	5	74	12	35	24	4	7
Alabama [4]	11	8	14	7	5	119	1	1
Mississippi [2]	4	3					2	1
West South Central States:								
Arkansas	3	5	43	38	9	83	0	0
Louisiana	12	13	44	5	72	24	1	1
Oklahoma [5]	4	4	71	47	21	65	1	1
Texas [4]	26	31	138	57	216	54	3	6
Mountain States:								
Montana [3]	2	2	14	54	4	389	0	0
Idaho [3]				3	16	9	1	0
Wyoming [3]	1				2	71	0	0
Colorado [3]	7	2			36	339	0	1
New Mexico	6	1	2	7	43	18	2	1
Arizona		7	30	8	137	22	1	2
Utah [3]		2	5	2	24		0	0
Pacific States:								
Washington	3				437	286	0	1
Oregon [3]	2		18	21	238	182	0	0
California	27	23	147	32	2,096	1,612	6	14
Total	373	446	1,024	572	12,971	26,239	151	152
First 21 weeks of year	11,339	13,475	135,782	100,109	207,146	576,371	4,872	2,995

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935
New England States:								
Maine	0	0	8	6	0	0	0	3
New Hampshire	0	0	10	12	0	0	0	0
Vermont	0	0	1	2	0	0	0	1
Massachusetts	5	2	202	234	0	0	1	1
Rhode Island	1	0	26	9	0	0	0	0
Connecticut	0	0	34	130	0	0	0	1
Middle Atlantic States:								
New York	0	2	703	1,105	0	0	5	6
New Jersey	0	1	284	177	0	0	2	2
Pennsylvania	3	0	573	564	0	0	10	5
East North Central States:								
Ohio	0	0	171	533	0	0	14	6
Indiana	0	0	123	79	1	1	1	2
Illinois	1	0	512	1,184	20	5	4	5
Michigan	4	0	259	374	0	0	5	7
Wisconsin	0	1	416	538	6	7	2	1
West North Central States:								
Minnesota	0	0	244	279	10	4	1	3
Iowa	0	0	136	79	33	3	7	4
Missouri	0	0	194	48	4	6	1	3
North Dakota	0	0	130	83	6	0	1	3
South Dakota	0	0	71	11	21	9	0	0
Nebraska	0	0	77	54	14	30	0	0
Kansas	0	0	267	40	38	45	0	2
South Atlantic States:								
Delaware	0	0	9	9	0	0	0	0
Maryland [2 3]	0	6	50	91	0	0	2	7
District of Columbia	0	0	17	46	0	0	0	1
Virginia	0	0	37	23	0	0	4	7
West Virginia	0	0	28	56	0	0	9	9
North Carolina	1	17	12	16	0	0	4	6
South Carolina	0	0	2	4	0	0	1	17
Georgia [4]	0	3	8		0	1	7	17
Florida	0	0	4	2	0	0	5	8

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 23, 1936, and May 25, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935	Week ended May 23, 1936	Week ended May 25, 1935
East South Central States:								
Kentucky	1	0	22	29	0	0	5	2
Tennessee	2	0	13	9	0	0	4	5
Alabama [4]	0	1	3	3	0	0	0	9
Mississippi [3]	0	0	4	6	0	0	1	4
West South Central States:								
Arkansas	0	0	5	7	0	0	3	7
Louisiana	0	2	4	5	0	0	13	10
Oklahoma [5]	0	1	34	------	2	2	6	0
Texas [4]	0	0	49	26	1	8	7	9
Mountain States:								
Montana [3]	0	0	56	9	12	12	0	0
Idaho [3]	0	0	16	1	6	0	1	0
Wyoming [3]	0	0	25	20	10	2	0	0
Colorado [3]	0	0	83	124	1	3	4	1
New Mexico	0	0	75	11	0	0	7	1
Arizona	0	1	11	81	0	0	2	3
Utah [2]	0	0	56	108	3	0	0	0
Pacific States:								
Washington	0	0	91	55	3	39	4	1
Oregon [3]	0	0	18	22	20	1	0	2
California	4	6	266	235	4	16	13	5
Total	22	37	5,438	6,494	215	203	186	179
First 21 weeks of year	381	515	155,837	149,368	4,834	3,981	2,455	2,911

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended May 23, 1936, 28 cases, as follows: Maryland, 2; Montana, 10; Idaho, 2; Wyoming, 6, Colorado, 2, Oregon, 6.
[4] Typhus fever, week ended May 23, 1936, 15 cases, as follows: Georgia, 8; Alabama, 2; Texas, 5.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April 1936										
Arizona	6	15	543	1	643	2	0	116	0	3
California	39	147	2,015	18	13,745	14	13	1,610	12	38
Georgia	18	42	1,261	212	45	24	1	100	0	17
Idaho	4	3	25	------	167	------	1	198	5	0
Illinois	69	147	287	17	128	------	1	3,892	21	24
Kansas	8	35	274	4	85	2	2	1,686	171	4
Louisiana	14	39	1,129	165	248	7	0	36	1	15
Mississippi	7	18	10,652	3,945	------	286	1	24	4	1
Nevada	2	------	18	------	20	------	0	70	0	0
Oklahoma [1]	20	35	1,698	55	49	18	2	181	3	8
Oregon	5	5	345	2	1,068	------	2	184	102	14
Rhode Island	8	6	3	------	145	------	1	163	0	1
South Dakota	1	8	23	------	31	------	0	340	124	1
Texas	39	174	2,635	1,901	1,581	58	0	322	6	19
West Virginia	48	37	453	------	297	------	2	173	0	19

[1] Exclusive of Oklahoma City and Tulsa.

April 1936

	Cases
Actinomycosis:	
Illinois	2
Anthrax:	
Georgia	1
Botulism:	
California	1
Chicken pox:	
Arizona	105
California	2,755
Georgia	237
Idaho	22
Illinois	1,592
Kansas	592
Louisiana	48
Mississippi	330
Nevada	6
Oklahoma [1]	31
Oregon	141
Rhode Island	34
South Dakota	56
Texas	304
West Virginia	118
Conjunctivitis:	
Georgia	1
Oklahoma [1]	3
Dengue:	
Louisiana	1
Texas	1
Dysentery:	
Arizona	25
California (amoebic)	5
California (bacillary)	13
Georgia (amoebic)	8
Georgia (bacillary)	4
Illinois (amoebic)	8
Illinois (amoebic carriers)	16
Illinois (bacillary)	5
Louisiana (amoebic)	3
Mississippi (amoebic)	49
Mississippi (bacillary)	311
Oklahoma [1]	2
Texas (bacillary)	3
Epidemic encephalitis:	
Arizona	1
Georgia	1
Illinois	7
Louisiana	1
Oklahoma [1]	4
Oregon	1
Texas	5
Favus:	
Illinois	1
Food poisoning:	
California	24
German measles.	
Arizona	94
California	2,337
Illinois	45
Kansas	8
Rhode Island	473
Granuloma, coccidioidal:	
California	4

April 1936—Continued

	Cases
Hookworm disease:	
California	1
Georgia	1,165
Louisiana	17
Mississippi	142
Impetigo contagiosa:	
Kansas	1
Oklahoma [1]	2
Oregon	41
Jaundice, epidemic:	
California	1
Lead poisoning:	
Illinois	4
Leprosy:	
California	1
Louisiana	1
Mumps:	
Arizona	184
California	2,770
Georgia	459
Idaho	172
Illinois	1,223
Kansas	341
Louisiana	50
Mississippi	1,239
Nevada	10
Oklahoma [1]	108
Oregon	127
Rhode Island	167
South Dakota	51
Texas	1,453
West Virginia	149
Ophthalmia neonatorum:	
Illinois	6
Kansas	1
Mississippi	11
Oklahoma [1]	1
Paratyphoid fever:	
California	1
Georgia	2
Oregon	1
Texas	13
Plague:	
California	1
Puerperal septicemia:	
Mississippi	15
Oregon	1
Rabies in animals.	
California	80
Illinois	40
Louisiana	15
Mississippi	6
Oregon	3
Texas	18
West Virginia	1
Rocky Mountain spotted fever:	
California	1
Idaho	1
Nevada	2
Oregon	5
Scabies:	
Oklahoma [1]	7
Oregon	27

April 1936—Continued

	Cases
Septic sore throat:	
California	17
Georgia	43
Idaho	4
Illinois	7
Kansas	15
Louisiana	5
Oklahoma	28
Oregon	5
Rhode Island	7
South Dakota	6
Tetanus:	
California	7
Georgia	3
Illinois	3
Louisiana	4
Rhode Island	1
South Dakota	1
Trachoma.	
Arizona	60
California	25
Idaho	15
Illinois	159
Mississippi	6
Oklahoma [1]	7
Trichinosis:	
California	2
Tularaemia:	
California	1
Georgia	4
Illinois	1
Kansas	1
Louisiana	5
Typhus fever:	
Georgia	6
Texas	8
Undulant fever:	
California	10
Georgia	6
Idaho	3
Illinois	2
Kansas	4
Mississippi	2
Oklahoma [1]	2
Vincent's infection:	
Illinois	19
Kansas	26
Oklahoma [1]	4
Oregon	11
Whooping cough:	
Arizona	47
California	1,962
Georgia	68
Idaho	11
Illinois	1,031
Kansas	179
Louisiana	174
Mississippi	516
Nevada	7
Oklahoma [1]	43
Oregon	55
Rhode Island	42
South Dakota	27
Texas	162
West Virginia	45

[1] Exclusive of Oklahoma City and Tulsa.

WEEKLY REPORTS FROM CITIES

City reports for week ended May 16, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Maine:											
Portland	0	...	0	118	0	3	0	0	0	7	21
New Hampshire:											
Concord	0	...	0	0	1	1	0	1	0	0	8
Manchester	...	...	...	...	...	...	...	...	...	...	...
Nashua	0	...	...	17	...	0	0	...	0	0	...
Vermont:											
Barre	...	...	...	...	...	...	...	...	...	...	...
Burlington	0	...	0	73	0	0	0	0	0	0	10
Rutland	0	...	0	23	0	1	0	0	0	0	3
Massachusetts:											
Boston	3	...	0	453	10	65	0	7	0	36	217
Fall River	1	...	0	12	0	3	0	0	0	4	32
Springfield	0	...	0	1	0	9	0	0	0	3	35
Worcester	2	...	0	121	9	13	0	0	0	9	51
Rhode Island:											
Pawtucket	0	...	0	0	0	2	0	0	0	0	14
Providence	0	...	1	25	3	18	0	3	0	1	61
Connecticut:											
Bridgeport	1	...	0	2	4	0	0	1	0	7	33
Hartford	0	...	0	3	2	10	0	0	0	2	20
New Haven	0	1	0	0	3	0	0	0	0	42	48
New York:											
Buffalo	0	...	0	42	8	41	0	8	0	0	145
New York	34	...	8	1,964	182	410	0	89	4	81	1,467
Rochester	0	...	0	7	6	4	0	1	0	2	88
Syracuse	0	...	0	95	3	13	0	1	0	17	44
New Jersey:											
Camden	1	1	1	19	2	5	0	0	0	0	...
Newark	0	1	0	11	6	83	0	6	0	10	97
Trenton	0	...	0	1	3	10	0	3	0	13	38
Pennsylvania:											
Philadelphia	1	5	5	729	41	79	0	18	0	58	494
Pittsburgh	6	...	2	12	44	97	0	10	0	23	200
Reading	2	...	0	28	3	1	0	0	0	4	42
Scranton	0	...	...	0	...	1	0	...	0	2	...
Ohio:											
Cincinnati	1	...	0	42	10	13	0	13	0	3	129
Cleveland	3	5	1	117	21	50	0	13	0	109	212
Columbus	2	...	0	3	2	5	0	6	0	12	99
Toledo	0	...	0	61	5	5	0	6	1	26	66
Indiana:											
Anderson	0	...	0	0	1	7	0	0	0	4	5
Fort Wayne	1	...	0	0	0	4	0	0	0	0	28
Indianapolis	0	...	1	3	25	31	0	7	0	28	120
Muncie	0	...	0	2	2	3	0	1	0	0	13
South Bend	0	...	0	0	0	3	0	0	0	1	16
Terre Haute	1	...	0	0	0	2	0	0	0	0	19
Illinois:											
Alton	0	...	0	0	1	3	0	0	0	0	9
Chicago	24	6	5	15	68	201	0	27	1	108	727
Elgin	0	...	0	0	3	1	0	0	0	2	12
Moline	0	...	0	0	1	7	0	0	0	0	11
Springfield	0	1	1	1	0	6	0	0	0	0	16
Michigan:											
Detroit	7	2	2	41	22	108	0	10	1	262	306
Flint	0	...	1	1	8	7	0	1	4	21	34
Grand Rapids	0	...	0	7	2	6	0	0	0	1	29
Wisconsin:											
Kenosha	0	...	0	0	0	5	0	0	0	2	12
Madison	0	...	...	4	...	10	0	...	0	7	...
Milwaukee	0	...	0	9	6	63	0	3	0	78	110
Racine	0	...	0	9	0	5	0	0	0	1	13
Superior	0	...	0	2	4	16	0	0	0	0	11
Minnesota:											
Duluth	0	...	0	10	4	16	0	0	0	22	24
Minneapolis	1	...	1	146	20	91	0	3	0	11	107
St. Paul	0	...	0	246	3	32	0	2	0	0	53

City reports for week ended May 16, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
Iowa:											
Cedar Rapids	1	-	-	0	-	2	0	-	1	1	-
Davenport	0	-	-	0	-	4	0	-	0	0	-
Des Moines	0	-	0	0	-	5	18	-	0	0	24
Sioux City	0	-	-	0	-	12	19	-	1	1	-
Waterloo	0	-	-	1	-	3	2	-	0	0	-
Missouri:											
Kansas City	4	-	1	2	13	50	0	8	0	1	88
St. Joseph	0	-	0	0	2	2	3	0	0	0	21
St. Louis	4	1	0	2	8	49	0	5	0	9	186
North Dakota:											
Fargo	0	-	0	0	0	0	0	0	0	0	7
Grand Forks	0	-	-	0	-	0	0	-	1	0	-
Minot	0	-	0	1	0	11	0	0	0	0	3
South Dakota:											
Aberdeen	0	-	-	0	-	2	0	-	0	0	-
Nebraska:											
Omaha	1	-	0	15	5	33	7	1	0	0	46
Kansas:											
Lawrence	0	-	0	0	2	0	1	0	0	0	5
Topeka	-	-	-	-	-	-	-	-	-	-	-
Wichita	1	-	0	1	2	20	0	1	0	0	24
Delaware:											
Wilmington	0	-	0	2	4	0	0	0	0	6	4
Maryland:											
Baltimore	8	-	0	362	27	26	0	8	0	39	225
Cumberland	0	-	0	0	1	2	0	0	0	0	16
Frederick	0	-	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	17	-	0	186	12	24	0	11	0	28	159
Virginia:											
Lynchburg	1	-	0	3	3	0	0	1	1	2	16
Norfolk	0	-	0	-	2	2	0	1	0	5	26
Richmond	1	-	0	0	4	24	0	4	0	1	60
Roanoke	0	-	0	1	1	0	0	1	0	0	19
West Virginia:											
Charleston	1	1	0	0	1	0	0	0	0	0	23
Huntington	0	-	-	0	-	2	0	-	0	0	-
Wheeling	0	-	0	64	2	1	0	1	1	0	18
North Carolina:											
Gastonia	0	-	2	0	0	0	0	0	0	0	5
Raleigh	0	-	0	0	2	0	0	0	0	1	13
Wilmington	0	-	0	0	2	0	0	2	0	0	18
Winston-Salem	0	1	0	20	2	0	0	1	0	0	9
South Carolina:											
Charleston	0	9	0	0	0	0	0	2	0	0	18
Columbia	0	-	0	0	0	0	0	0	0	0	8
Florence	0	-	0	1	0	0	0	0	0	0	5
Greenville	0	-	0	2	3	0	0	0	0	0	13
Georgia:											
Atlanta	1	-	0	0	14	11	0	1	0	0	117
Brunswick	0	-	0	0	1	0	0	0	0	0	5
Savannah	0	2	1	0	4	0	0	2	0	0	33
Florida.											
Miami	0	5	1	4	2	1	0	3	1	15	23
Tampa	0	-	0	12	1	1	0	3	0	1	27
Kentucky:											
Ashland	0	4	2	9	5	0	0	1	0	3	27
Covington	0	-	0	3	0	1	0	1	0	0	18
Lexington	0	-	0	10	2	0	0	2	0	2	19
Louisville	0	1	0	79	6	14	0	2	0	10	75
Tennessee:											
Knoxville	0	4	1	4	9	1	0	2	0	0	37
Memphis	0	-	1	0	7	5	0	6	4	24	76
Nashville	0	-	1	3	10	3	0	2	0	0	45
Alabama:											
Birmingham	0	3	1	0	4	2	0	5	1	0	78
Mobile	0	-	0	0	0	0	0	0	0	0	20
Montgomery	0	1	-	0	-	0	0	-	0	1	-
Arkansas:											
Fort Smith	0	-	-	0	-	0	0	-	0	0	-
Little Rock	0	-	1	0	4	0	0	1	0	0	7
Louisiana:											
Lake Charles	0	-	0	1	0	0	0	0	0	0	2
New Orleans	9	6	3	6	17	2	0	9	1	34	147
Shreveport	1	-	0	23	3	1	0	2	0	0	34
Oklahoma:											
Oklahoma City	1	10	0	0	4	12	0	1	0	0	40
Tulsa	0	-	-	0	-	4	0	-	0	0	-

City reports for week ended May 16, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Texas											
Dallas	5	------	0	63	7	9	0	1	0	7	49
Fort Worth	1	------	0	5	2	2	0	2	0	0	40
Galveston	1	------	0	0	1	0	0	0	0	0	9
Houston	8	------	0	0	10	0	0	9	0	0	76
San Antonio	2	------	0	19	8	2	0	8	0	0	59
Montana											
Billings	0	------	0	0	1	1	0	0	0	1	8
Great Falls	0	------	0	0	0	1	0	0	0	0	8
Helena	0	-----	0	0	0	6	3	0	0	0	5
Missoula	0	-----	0	1	0	3	0	0	0	0	4
Idaho Boise	0	-----	0	3	1	1	0	0	0	0	10
Colorado											
Colorado Springs	0	-----	0	0	2	8	0	0	0	2	12
Denver	1	-----	0	15	4	14	1	3	0	30	92
Pueblo	0	-----	0	0	0	31	0	1	0	1	6
New Mexico											
Albuquerque	0	1	1	18	1	16	0	1	0	0	11
Utah											
Salt Lake City	0	-----	1	18	4	23	4	1	0	14	35
Nevada Reno	------	------	------	------	------	------	------	------	------	------	------
Washington											
Seattle	0	------	0	208	2	7	1	2	0	6	70
Spokane	0	-----	0	14	1	20	0	2	0	14	37
Tacoma	0	-----	0	30	2	0	0	0	0	0	24
Oregon											
Portland	0	-----	0	9	2	6	0	4	0	32	79
Salem	0	2	--------	14	-------	3	0	-------	0	0	-------
California											
Los Angeles	6	22	2	323	13	38	0	26	0	50	317
Sacramento	1	------	0	1	0	7	0	1	0	18	26
San Francisco	4	2	0	201	6	89	0	16	0	30	182

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts			
Boston	5	3	0
Rhode Island			
Providence	0	1	0
New York			
Buffalo	1	0	0
New York	23	9	0
New Jersey			
Newark	3	0	0
Pennsylvania			
Philadelphia	1	0	0
Pittsburgh	1	2	0
Reading	4	0	0
Ohio			
Cincinnati	1	0	0
Cleveland	2	0	0
Columbus	1	1	0
Indiana			
Indianapolis	1	0	0
Illinois			
Chicago	10	2	0
Michigan			
Detroit	1	0	2
Minnesota			
Minneapolis	2	1	0
St Paul	1	0	0
Iowa:			
Des Moines	2	0	0
Missouri			
St Louis	3	1	0
North Dakota			
Fargo	1	1	0
Nebraska			
Omaha	1	0	0
Maryland			
Baltimore	10	2	0
District of Columbia			
Washington	7	5	0
Virginia			
Norfolk	2	0	0
Roanoke	0	1	0
North Carolina			
Raleigh	1	0	0
Wilmington	2	1	0
South Carolina			
Charleston	2	0	0
Georgia			
Atlanta	0	1	0
Kentucky:			
Ashland	0	1	0
Tennessee			
Knoxville	1	0	0
Memphis	0	1	0
Nashville	0	0	1
Louisiana			
New Orleans	3	1	0
Oklahoma			
Oklahoma City	1	1	0
Texas			
Houston	0	1	0
Utah			
Salt Lake City	1	0	0
California			
Los Angeles	3	2	3
San Francisco	0	0	1

Epidemic encephalitis.—Cases: Milwaukee, 1, St. Louis, 1, Louisville, 1.
Pellagra.—Cases: Charleston, S. C., 2, Savannah, 3, Miami, 1, Memphis, 1, Birmingham, 1, Mobile, 1; Montgomery, 1, San Francisco, 1.
Rocky Mountain spotted fever.—Cases: Billings, 2.
Typhus fever.—Cases: Atlanta, 1, Miami, 1.

FOREIGN AND INSULAR

CUBA

Habana—Communicable diseases—4 weeks ended May 9, 1936.—During the 4 weeks ended May 9, 1936, cases of certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Disease	Cases
Diphtheria	13	Tuberculosis	45
Malaria	[1] 19	Typhoid fever	[1] 43
Poliomyelitis	[1] 4		

[1] Includes imported cases.

LATVIA

Communicable diseases—January–March 1936.—During the months of January, February, and March, 1936, cases of certain communicable diseases were reported in Latvia as follows:

Disease	January	February	March	Disease	January	February	March
Botulism	2	1	2	Puerperal septicemia	9	6	9
Cerebrospinal meningitis	14	19	16	Scarlet fever	295	322	386
Diphtheria	102	80	72	Tetanus	2	2	
Erysipelas	30	32	31	Trachoma	58	45	73
Influenza	195	319	216	Tuberculosis	423	361	340
Leprosy	4	3	3	Typhoid fever	64	35	31
Measles	129	263	390	Typhus fever			5
Mumps	7	8	17	Undulant fever			1
Paratyphoid fever	6	11	14	Whooping cough	133	76	84
Poliomyelitis	2		1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for May 29, 1936, pages 718–730. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued June 26, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India—Bassein.—During the week ended May 16, 1936, 3 cases of cholera, with 2 deaths, were reported in Bassein, India.

Plague

Belgian Congo—Drodro.—On May 16, 1936, 1 case of plague was reported in Drodro, Belgian Congo, near Lake Albert.

Peru.—During the month of April 1936, plague was reported in Peru as follows: Libertad Department, 6 cases, 2 deaths; Lima Department, 3 cases, 3 deaths, Callao City, 1 case, 1 death; Piura Department, 2 cases, 1 death.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 JUNE 12, 1936 No. 24

THE DEVELOPMENT OF A TECHNIQUE FOR MEASURING THE KNOWLEDGE AND PRACTICE OF MIDWIVES[1]

By MAYHEW DERRYBERRY, *Consultant in Health Education Techniques*, and JOSEPHINE DANIEL, *Research Worker in Child Hygiene and Public Health Nursing, United States Public Health Service*

Improvement in the care given women during the maternity cycle is, and has been for the past decade, an important objective of public health service. The procedures followed to obtain this objective have varied in the several sections of the country because of the differing conditions prevailing in the various localities. In the rural sections of the Southern States, one of the elements to which consideration must be given in effecting any progress in improving maternity and infant hygiene is the education and supervision of the Negro midwife, who at the time of delivery is frequently the sole attendant of a maternity case.

In many of the Southern States, public health authorities have realized the need for improving the midwifery service and have instituted programs with that objective in view; but the procedures incorporated in these programs are extremely varied in the several States as well as for the different counties within a given State. In some States the permits are granted to midwives solely on the basis of a local doctor's recommendation; in other States intensive group instruction is given at midwife classes before the midwives are given their permits, and then later nursing visits are made for supervisory purposes; in other States permits are granted without any previous instruction, and the only education and control of the midwife consists of frequent visits by the nurse, coupled with supervisory ante-partum and post-partum visits with the midwife to her patients.

Certainly some of the many procedures now being practiced must be more effective than others. If it were known which ones yield the best results, then definite progress could be made toward improving

[1] From the Office of Studies of Public Health Methods in cooperation with Division of Domestic Quarantine and the Office of Child Hygiene Investigations. The senior author was very kindly lent by the American Child Health Association to the U. S. Public Health Service for the purpose of conducting this study.

Grateful acknowledgment is made to the State Health Department of Virginia and to the State Board of Health of North Carolina for the privilege of working in the respective counties and for a list of the midwives and their addresses, thus facilitating the collection of the data.

In connection with this paper, the reader is referred to The Rural Midwife: Her Social and Economic Background and Her Practices as Observed in Brunswick County, Va., Pub. Health Rep., 50:1807-1815, (Dec. 27) 1935.

all programs for control of the midwife. The question then is: Which of the present existing procedures secures the best midwifery service with the minimum of public expenditure? The Office of Studies of Public Health Methods of the United States Public Health Service, long interested in evaluation studies of public health procedures, recently began a study of the problem for this very purpose of determining which procedures have been most effective in producing competent midwife service. Such an evaluation when completed may well be considered a sound basis for the construction of efficient programs for controlling midwives in the rural sections of the South.

METHOD OF EVALUATION

It is axiomatic that any procedure is effective to the extent that it produces results. For this evaluation of programs of midwifery supervision and control, it is assumed that communities in which midwives are practicing the procedures outlined in the manuals of midwifery practice issued by the respective State health departments have better control over their midwives than communities in which the midwives are not following accepted obstetrical practice. The aim will be to discover the methods of selection, instruction, supervision, and control of the midwives used in those counties that have capable midwives as opposed to the methods employed in those counties where the quality of the midwife practice leaves much to be desired.

The evaluation, then, may be conceived in terms of four distinct steps of procedure:

1. Construction and preliminary trial of a test for the measurement of a midwife's knowledge and practice.
2. Development of a means of discovering and recording all those administrative procedures of a health department concerned with the control and supervision of midwives.
3. With the techniques developed in steps 1 and 2, the measurement of a sampling of midwives in each of a number of communities, and the recording of the health departments' activities for those communities.
4. Relating the quality of service rendered by the midwives in each community to the type of midwife control used in that community, thus precipitating the methods of control that have been effective in producing a high quality of midwife service.

These steps are somewhat discrete procedures and must be taken consecutively in the order named. What follows herein is a report of the experimentation that was conducted in completing the first step of the project. It describes in detail the experimental derivation of a technique for measuring midwife information and practice.

THE NEED FOR AN INDEX

Records of the actual procedures followed by a midwife in her ante-partum, delivery, and post-partum care of a number of maternity cases would constitute an ideal measure of the quality of maternal service given by that particular midwife. From such records one could ascertain the extent to which the midwife was following the techniques prescribed in the midwifery manual.

To obtain unbiased observational records of midwives in their routine activities, however, is almost impossible. If they know that they are being observed, they are likely to omit certain things which they would otherwise do and follow more closely the prescribed procedures. Furthermore, the observation of each of a number of midwives for several maternity cases necessitates an unreasonable amount of time and expense. It is essential, therefore, to develop some other method that will give an index of the quality of care given by a midwife—in other words, some measure that will distinguish midwives who practice good techniques from those who follow poor and even bad practices. This index should reflect distinctions in the quality of service rendered by different midwives rather than attempt to measure directly the ability of each midwife to meet emergencies, or their understanding of the maternity cycle.

Any index that is devised must be objective; that is, the index must be of such a nature that the results obtained are not dependent upon the individual who uses the index. Midwives who register as superior midwives when this index is applied by one examiner should also register as superior if measured by some other examiner.

The index must also be representative of the actual information and conduct of the midwife. It must be shown to be indicative of the variations in the quality of service which the various individual midwives give. Those midwives who pay no attention to accepted methods of cleanliness and prescribe for their patients all sorts of home remedies, many of them based on superstitions, must register low on the index as compared with those midwives whose routine procedures conform to the pattern set forth in the midwife manual.

After careful consideration had been given to a number of possible methods of developing an index with these characteristics, the personal interview was selected as the method most likely to yield the desired results in the practical situation. Accordingly, an extensive form, containing some 66 objective standardized groups of questions on midwifery information and practice, was constructed. These questions were focused on the general subjects of equipment, prenatal care, complications of pregnancy, delivery care, complications of delivery, and post-partum care of both the mother and the baby.

Information was sought on both good and bad practices under each of these general headings.[3]

The questions were framed in a variety of ways in the attempt to elicit the truth. The fact that a midwife may know the correct procedure is no assurance that she follows that procedure. Insofar as possible, the questions were asked in terms of behavior rather than information. Often questions on the same practices were asked in more than one connection in the hope of arriving more nearly at the actual practice. For example, each of the following questions was asked in an attempt to identify those midwives who practice vaginal examinations:

Have any of your cases insisted that you make a vaginal examination? (If yes) What did you do? (If no) What would you do?

What can you find out from an internal examination?

Does it help you to make an internal examination?

Since the colored midwife is very susceptible to suggestion, many of the questions were stated negatively, thus causing her to defend the proper procedure. For example, note the following sample questions:

Do you remind the expectant mothers that they should eat enough for two people?

When you get water from a good deep well, do you bother to boil it? (If yes) Why?

The first drafted interview was subjected to a preliminary trial, and after a few slight revisions no further changes were made before the preliminary data were gathered.

EVIDENCE FOR THE INTERVIEW FORM

In the beginning of the study, advantage was taken of the fact that the Office of Child Hygiene Investigations had been conducting an intensive study of the midwives in a county in Virginia. The nurse who had been conducting that study was engaged to initiate and carry on the field work in connection with the development of the index. Midwives were interviewed by the nurse, using the objective interview form, in the county in which she had been working, as well as in two adjoining counties, one of which was in North Carolina.

The geography and population of the three counties are markedly similar. All 3 of the counties are strictly rural in that their largest town has a population of around 2,000. The Negro population slightly outnumbers the white, and midwives deliver approximately 60 percent of the total births in two of the counties and 25 percent

[3] A copy of the interview form (abbreviated) and the directions for administering and scoring are available in mimeographed form and may be obtained on request addressed to the Office of Studies of Public Health Methods, U. S. Public Health Service, Washington, D. C.

in the other county. Most of the midwives are Negro, past middle age, unable to read or write, and live on small farms more or less isolated from one another. Since transportation is difficult, they seldom visit outside their immediate neighborhood.

Concerning the supervision that has been given the midwives, there are wide differences among the counties. In county A, there had been no county health unit prior to January 1, 1935, and consequently the only supervision and education given had come from a nurse in the State health department. She made an annual supervisory visit to the county, but, because of her extensive territory, could not give intensive supervision (such as home visits, and demonstration ante-partum and post-partum home calls) to the midwives of any one of the several counties under her jurisdiction. In county B, supervision of midwives was begun in 1922 by the State health department. In 1924, when a full-time county nurse was employed, she assumed this responsibility. The program has been interrupted for short periods several times, but the supervision of the midwives of this county has been much more intensive than in county A. In county C, the midwives were under continuous intensive supervision from 1923 to 1932 by a nurse employed as the county public health nurse. She visited the midwives in their homes frequently, inspecting their equipment, accompanied them on calls to their patients, and demonstrated the prescribed techniques of ante-partum and post-partum care. Since 1932 the supervision has been under the State department of health. A State nurse holds annual classes, bag inspection, and issues the annual licenses.

In counties A and B the midwives are given a permanent license, but in county C only an annual license is issued. This latter procedure allows for more effective control, since the weeding out of the worst midwives from the group occurs annually.

To obtain data on the adequacy of the interview form, 20 midwives were interviewed in county A, 34 in county B, and 26 in county C, making a total of 80 midwives interviewed.

SCORING THE INTERVIEW FORMS

When the interviews had been completed, the responses to each question were given a numerical value and then the sum of these values for each midwife represented her score. The correct response to each question, with one or two exceptions, was given a score of one. For example, if the answer to the question, "What food other than breast milk do you give the baby?" was "Boiled water", the question was given a score of one. Such responses as "sugar bubby", "water with a pinch of soda and sugar" were scored zero. A minus

score of two was given if the midwife believed in such superstitions as "burnt feathers under the nose", "snuff in the face", or "eating raw red onion" as methods of hurrying up the birth of the baby.[3]

OBJECTIVITY AND RELIABILITY OF THE INTERVIEW FORM

It was impractical to determine, empirically, the objectivity of the interview form by having two interviewers question the same group of midwives and then compute the degree of agreement between results obtained by the two examiners independently. But the very nature of the questions, which were always asked in the same way, and the fact that the interviewer always recorded the total response given, argue the objectivity of the method.

A large number of questions were included to insure some representation of each of the many phases of midwife practice and knowledge. Of course, all possible questions were not asked, nor would it have been possible to ask questions about every phase of midwifery care; but proof that the questions included are representative of the quality of information and behavior peculiar to each midwife is furnished from an internal analysis of the data. By randomly dividing the entire battery of questions into two groupings and then scoring the two separate sets of questions, two scores were obtained for each midwife—one on each half of the material. A comparison of the relative standing of each midwife on one set of questions with her relative standing on the other set of questions indicates the accuracy of the distinctions made by the interview form. If the midwives who make relatively high scores on one-half of the questions also make relatively high scores on the other half, and if those who score low on one set also score low on the other set, then it can be assumed that the interview form contains an adequate number of questions, for the same distinctions are made between the midwives irrespective of which set of questions is used. Also it may be safely inferred from such analysis that the addition to the interview form of other questions of similar nature would not materially affect the distinctions between the midwives shown by the entire set of questions used. An index of the degree to which the same distinctions are made using the two halves of the material is afforded by the correlation between the two sets of scores (table 1).[4] The extent to

[3] Complete directions for scoring the form finally adopted are given in a mimeographed supplement to this paper and may be obtained, upon written request, from the Office of Investigations of Public Health Methods.

[4] The correlation was computed using the Pearson product moment formula:

which the total material makes reliable distinctions between the midwives is shown in the last column of the table.[5]

The correlation of .95, representing the reliability of the entire battery of questions, indicates clearly that the interview form as constructed makes reliable distinctions between the midwives, and that the questions are representative of some common factor. Since all the questions are based on midwifery information and practice, it may be assumed that the common factor is quality of midwife service.

TABLE 1.—*Reliability of the midwife interview form (correlations between scores on one half of the interview form with scores on the other half of the interview form)*

Source of data	Number of cases	Correlations	
		One-half with one-half	Reliability of total material [1]
County A	20	.90	.95
County B	34	.90	.95
County C	26	.84	.91
Total	80	.90	.95

[1] See footnote 5, below.

VALIDITY OF THE METHOD

Is the assumption that this index is a measure of the quality of midwife service and of the knowledge which midwives have a valid assumption? Several types of data were used to prove the validity of the index. The first was a comparison of the midwives from the three counties. Since, by definition, the midwives in county A had had considerably less supervision than the midwives in county B, and those in county B had had somewhat less intensive supervision than those in county C, we would expect the midwives in county A to be inferior to the two other groups, and the midwives in county C to be slightly better than either group A or B. If the technique actually reveals differences in midwives that are produced by supervision, then the scores of the midwives in county A should be lower than the scores of the midwives of the other two counties.

It is evident from the distributions of the scores of the midwives in the three counties (table 2) that the scores in county A are not as high as the scores in the other two counties, and that the scores in county B tend to be lower than those in county C. In terms of

[5] The figures in this column represent the correlation that would be expected between the entire set of questions and another set of questions of equal number and reliability. They are obtained using Spearman's formula:

$$r_s = \frac{2r_h}{1+r_h}$$

where r_s is the reliability of the total test and r_h is the correlation between the scores on two halves of the test (Garrett, Henry E.: Statistics in Psychology and Education, Longmans, Green & Co., New York, 1926, p. 271).

average scores, there are about 22 points of difference between group A and group B, and the same amount of difference between group B and group C. In terms of median scores, the difference is even greater.[6] The distinctions between groups of midwives made by the interview form correspond with the differences that are known to exist. As a measure to distinguish extreme groups, the interview form is therefore valid.

TABLE 2.—*Distribution of scores on the midwife interview form for the 3 counties included in the study*

Midwife interview scores	Frequency of occurrence of each score in—		
	County A	County B	County C
150–159		2	2
140–149	1	2	8
130–139	1	3	5
120–129	1	5	3
110–119	1	3	3
100–109	1	5	1
90–99	1	5	2
80–89	2	4	2
70–79	3	4	
60–69	6		
50–59	3	1	
Total	20	34	26
Mean score[1]	84.2	106.4	128.0
Median	74	101	137

[1] These means were computed from the raw ungrouped data.

Ratings of the ability of the midwives in county B, made by the nurse who had had intimate contact with these midwives for a period of 7 months, served as the second criterion for the establishment of the validity of the interview form. The nurse who made the ratings had just completed an intensive study of these midwives, during which time she had talked with them in their homes, had watched the majority of them at both ante-partum and post-partum visits, and in three instances had observed the midwives during deliveries. The 34 midwives were independently rated on a scale of from 1 to 10, on 2 separate occasions. The correlation between the two sets of ratings is .94.[7] The correlations between each of the two ratings and the scores on the interview form are .84 and .86. Considering the unreliability of subjective ratings, these correlations indicate a fairly high degree of validity for the discriminations made by the interview form.

As previously suggested, the ideal criterion would be complete actual records of the kind of prenatal, delivery, and postnatal care which each midwife habitually gives. Observations of the mid-

[6] The difference between the means of group A and group B, and the difference between the means of group B and group C, are reliable differences. The standard deviation of the first difference is 7.6 and of the second difference is 5.9.

[7] One would ordinarily expect a correlation of unity between the 2 sets of ratings by the same person. The fact that the correlation is not unity is partial explanation for the lower correlations with the scores on the interview form.

wives, however, would not reveal this, for if the midwife knew the proper procedure, she would very likely follow it in the presence of the nurse, although she might behave in an entirely different manner were the nurse not present. Then, too, to obtain such observations is practically impossible in a rural community where distances are great and where facilities for communication are limited.

An attempt was made, therefore, to discover further the kind of care the individual midwives give by questioning the mother concerning the prenatal care and by questioning the attendant at the birth, other than the midwife, in regard to the delivery and post-partum care.

It was soon discovered that little or no prenatal advice was being given. Many of the cases did not engage the midwife in advance; and even when they did, the midwife seldom visited an expectant mother. Consequently, questions about what advice had been given by the midwife were often embarrassing to the mothers. In view of this difficulty, and since none of the midwives in county B, where it was possible to do this intensive investigation, gave anything like adequate prenatal service to their patients, the questions on ante-partum care were discontinued.

However, during the limited time of the preliminary experiment, information on delivery and post-partum care was obtained on a total of 56 mothers whose homes were visited by the field worker after the babies had been delivered by midwives from county B. Both the other attendant at the birth and the mother herself were questioned concerning the way in which the midwife prepared for and conducted the delivery, how she cared for the baby, and what intra-partum and post-partum care she gave the mother. It is, of course, difficult to judge the quality of a midwife on the reports of her activity as given by the patient or the attendant. In 17 of the 56 cases the midwife arrived after the baby had been born. For such cases, questions on preparation and the delivery did not apply. In six cases the doctor was called in either by the midwife or the family, and in these cases the delivery care and post-partum advice were given by the physician.

In many instances the mothers did not know whether the midwife had carefully washed her hands before delivering the baby, whether "drops" had been put in the baby's eyes, or whether many other of the accepted techniques had been followed. The difficulties in this type of material make direct evaluation impracticable unless a large number of post-partum reports can be obtained for each midwife. In the period covered by this study, it was impossible to secure more than 3 cases for any one midwife, and this number was possible for only 11 midwives. Two cases were obtained for each of nine midwives, and there was only one case for each of five others. The remaining mid-

perform a better quality of service than those who make low scores; therefore, the value of any item may be judged by separating the midwives into two groups, according to the way in which they answer the item, and comparing the total scores (scores obtained on all the questions) of those midwives who answer the particular item correctly with the total score of those who answer incorrectly. If a correct reply is more often associated with a high total score, and an incorrect reply more frequently accompanies a low total score, then that item or question may be considered of value, for it distinguishes good midwives from poor ones. Take the following question: "Do any of your cases ever engage you in advance? Does it make any difference whether they do or not? What?" In response to this question, 27 midwives stated that they urged their cases to engage them early in order that they might discover danger signs or the need for a doctor. The average score for these 27 midwives was 135, whereas the 53 who did not mention this reason for early engagement averaged only 94. Moreover, very few of the midwives who answer the question incorrectly make higher scores than those who answer the item correctly, and vice versa, as may be seen in the first two histograms in figure 1. This question is therefore highly diagnostic, for the midwives who answer it correctly make much higher scores than those who do not answer it correctly.

Contrast with the above the results on the following question: "What kinds of food should an expecting [9] mother eat?" Cereal was mentioned by 29 midwives. Their average total score was 110. The average score of the 51 who failed to mention cereal as desirable food was 107. The difference is negligible. The histograms showing the distribution of scores for these two groups are almost identical. The question is useless in distinguishing the good and poor midwives, and was excluded from the final test.

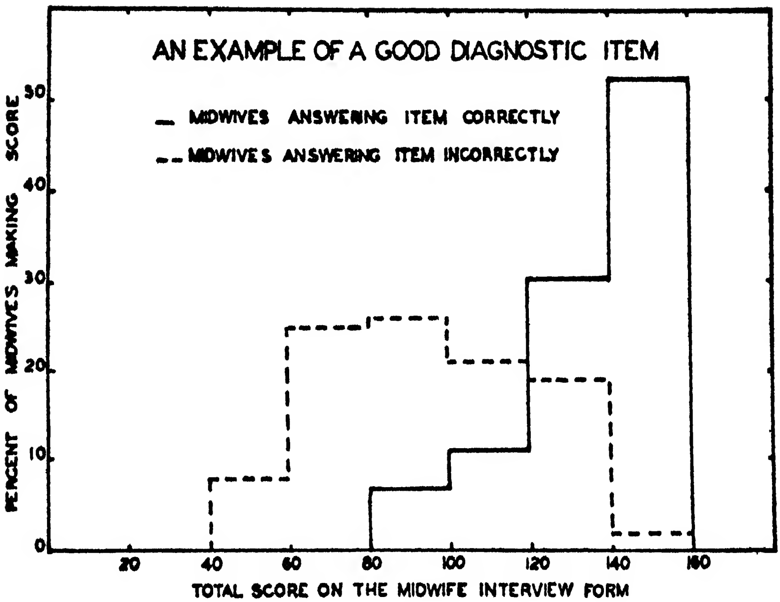
Each of the remaining 192 items was subjected to this type of analysis. To take into account both the overlapping of scores and the difference between the mean scores of the midwives who answered an item correctly and those who answered it incorrectly, an index of the significance of each item was computed.[10] A distribution of

[9] The correct term here is "expectant", but the midwives use "expecting", and the questions are stated as nearly as possible in their "language" Many other expressions in the interview form were stated in terms used by the midwives without regard to their grammatical accuracy

[10] The significance of each item is the relation of the difference between the mean scores of the midwives in the two categories (those who answered the item correctly and those who failed the item) to the standard deviation of that difference. The formula is:

$$\textit{Index of significance} = \frac{M_1 - M_2}{\sqrt{\sigma^2_{M_1} + \sigma^2_{M_2}}}$$

where M_1 is the average score of the midwives that responded to the item correctly, σ_{M_1} is the variability of M_1; M_2 and σ_{M_2} are similar constants for the distribution of scores for those midwives who answer the item incorrectly.



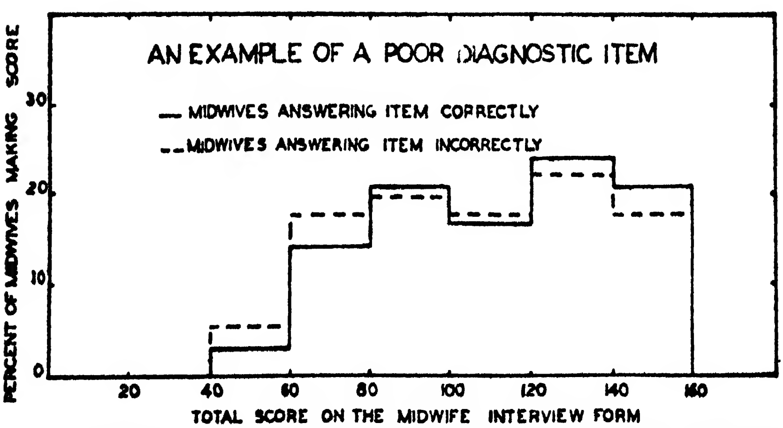


FIGURE 1.—Distribution of scores on the midwife interview form for (1) midwives who answer an item correctly and (2) midwives who answer the item incorrectly

these indices of significance is given in table 3. In the final selection of items only the items with significance of 3.0 or more were retained.

TABLE 3.—*Distribution of the indices of significance for all the items in the midwife interview form*

Index of significance	Frequency of occurrence	Index of significance	Frequency of occurrence
0–0.9	17	6.0–6.9	26
1.0–1.9	17	7.0–7.9	7
2.0–2.9	18	8.0–8.9	9
3.0–3.9	29	9.0–9.9	3
4.0–4.9	39		
5.0–5.9	27	Total	192

In addition to the exclusion of items of low diagnostic significance, elimination was made of those questions which had proved difficult of administration in the field, and also the items which had presented difficulty in the scoring.

There were only 14 items of real significance that had proved difficult to administer or score. The majority of the items with such difficulties had already been excluded by the previous analysis. The very fact that the midwives could not easily understand an item or that the responses to an item were sometimes ambiguous, tended to lower its diagnostic value.

As a result of the 3 types of exclusions just described, the original 219 items were reduced to 126, which can be grouped into 41 questions.

EVIDENCE FOR THE ABBREVIATED INTERVIEW FORM

As assurance that the abbreviation of the interview form has not destroyed its value, both the reliability and the validity of the test were recomputed. When the scores for one-half of the questions are correlated with the scores for the other half of the questions, the resulting correlations indicate that the test is still sufficiently extensive to be representative of the quality of midwife service. The same distinctions between the midwives are made irrespective of which group of the questions is used.

TABLE 4.—*Reliability of the abbreviated midwife interview form*

Source of data	Number of cases	Correlations: One half with one half	Correlations: Reliability of total material [1]
County A	20	.93	.96
County B	34	.88	.94
County C	26	[2] .77	.87
Total	80	.90	.95

[1] Obtained by using the Spearman correction formula; see footnote 5, p. 763.
[2] The scores for the midwives in this county are much more homogeneous than the scores for the midwives in the other 2 counties The reliability of the test is lowered by the low standard deviation. The standard deviation of the scores for counties A and B is 10, and for county C is 8.

The average score on the abbreviated form for the midwives in county A was 50.4; in county B, 65; and in county C, 85. A comparison of the differences between these averages with those obtained using the original form shows that the same distinctions between the counties have been preserved in abbreviating the interview form.

The correlations of the two sets of ratings by the nurse with the scores on the abbreviated test in county B were .83 and .85. These correspond favorably with the previous correlations of .84 and .86. It is safe to say that abbreviating the test has not lessened its value as a measure of the quality of midwife service.

SUMMARY

From a large battery of questions on midwifery practice and information, an interview form has been constructed as an index of the quality of service a midwife renders when she attends a maternity case. The technique has been shown to be a reliable and valid measure of the service given by an individual midwife. Therefore, the degree of success or failure of any given program of midwifery control can be judged using this interview form.

In addition to its usefulness as a method of evaluating public health effort, the technique will serve to select the better midwives. Nurses in their supervisory programs can interview the midwives in their community and determine those who need the most supervision and teaching. Midwives who score extremely low can be eliminated by taking away their permits. Others with high scores need not be checked so often. The supervisory time will thus be focused on those midwives needing the most help, who may reasonably be expected to profit therefrom.

The interview form was developed as the first step in the evaluation study of various public health procedures used in the control of the midwife in the Southern States. Future studies contemplate completing the evaluation by carrying out the three remaining steps described in the beginning of this paper. A technique for registering the administrative procedures followed by health departments for the education, supervision, and control of midwives will be constructed. Utilizing this technique, the health department practice for a number of counties in which the modes of midwife control are different will be recorded, and a number of midwives in each of these counties will also be measured using the midwife-interview form. From the relationships between these two sets of data it will be possible to determine which procedures are effective in producing a high quality of midwife service. Programs of midwifery control can then be constructed to include procedures of tested effectiveness.

THE ANEMIA OF DEAMINIZED CASEIN

By M. I. Smith, *Principal Pharmacologist*, and E. F. Stohlman, *Junior Pharmacologist, Division of Pharmacology, National Institute of Health, United States Public Health Service*

In 1904, Levites (1), and in 1906, Skraup and Hoernes (2) prepared and examined the deaminized product obtained by treating casein with nitrous acid. In 1921, Dunn and Lewis (3) extended these observations and described an improved method for the preparation of deaminized casein. These authors also studied the nitrogen distribution in deaminized casein as compared with casein and found, in addition to the nearly complete disappearance of free amino nitrogen, diminution of tyrosine and histidine and complete absence of lysine.

Aside from the disappearance of free amino nitrogen, the precise chemical change taking place in the protein molecule through deaminization with nitrous acid is not known. Lewis and Updegraff (4) consider the variable loss of tyrosine to be a secondary reaction, dependent upon the time and temperature of the reaction. Analysis of deaminized casein for tryptophane and arginine by Wiley and Lewis (5) revealed no significant change, while about half of the histidine was found to be destroyed. White (6) found no change in the cystine content of deaminized casein. The formation of diazo derivatives were suspected by Treves and Salomone (7), and the possibility of formation of nitroso compounds was suggested by Dunn and Lewis (3).

The biological and nutritional properties of deaminized casein have also been examined. Digestion of deaminized casein *in vitro* with pepsin and trypsin was found by Dunn and Lewis (8) not to differ materially from that of casein. Steudel (9) fed deaminized casein to rats at a 20 percent level and observed an immediate decline in weight. The nutritive failure was not corrected by lysine supplements.

Of particular interest and great significance is the recent report by Hogan and Ritchie (10), who found that when rats were fed a diet containing deaminized casein they developed anemia. Gelatin and gliadin supplements, individually or in combination to compensate for the known amino acid deficiencies of deaminized casein, failed to protect. This led them to suspect a toxic factor, against which, they argued, was their observation that casein added in equal amount with the deaminized casein prevented the anemia. On the basis of these observations they were unwilling to commit themselves definitely, either in favor of a deficiency or in favor of a toxic factor, and were forced to assume that either casein contains some group which overcomes the toxic action of deaminized casein, or that it contains some nutrient which is normally required, but is needed in greater amount when deaminized casein is included in the diet.

We undertook to examine this type of experimental anemia chiefly for its biologic and morphologic characteristics. In the course of this work certain observations were made which, in the main, confirm the work of Hogan and Ritchie. We believe, however, that we have secured conclusive evidence showing that the deaminized casein anemia is an intoxication and not a deficiency disease, though the precise nature of the toxic factor still remains to be determined.

EXPERIMENTAL

The deaminized casein was prepared according to the method of Dunn and Lewis (3) The albino rats used in these experiments were from an inbred colony on a stock diet of yellow corn, whole wheat, oats, bread and milk, and some lettuce fed twice a week. Blood counts, reticulocyte counts,[1] hemoglobin determinations,[2] and Wright's blood films were studied from time to time.

The composition of the experimental rations of special interest in connection with this work is outlined in table 1. In some of the diets a vitamin B_1B_2 concentrate obtained from brewers' yeast with an activity for B_1 and B_2 of from 50 to 100 times that of dried brewers' yeast was used[3] In the others, dried brewers' yeast was used as a source of vitamins of the B group Salt mixture 185 of McCollum and Simmonds (12) supplied the inorganic constituents, and cod liver oil furnished vitamins A and D

TABLE 1 —*Composition of experimental rations*

Ration	1	2	3	4	5	6	7	8	9	10	11
Deaminized casein	10	10	10	10	10	10				---	-
Deaminized casein extracted with CH_3OH NaOH							10		10	10	--
Deaminized casein extracted with CH_3OH-HCl								10			-
Reprecipitated deaminized casein									-		10
Casein					5	15				15	15
Lysine tyrosine histidine		2								-	--
B_1B_2 concentrate	0 2	0 2					0 2	0 2			--
Dried brewers yeast			5	12	5	5			12	5	5
Salt mixture 185	4	4	4	4	4	4	4	4	4	4	4
Cod liver oil	2	2	2	2	2	2	2	2	2	2	2
Olive oil	8	8	8	8	8	8	8	8	8	8	8
Corn starch	76	74	71	64	66	56	76	76	64	56	56

FEATURES OF THE ANEMIA

The features and progress of the anemia will be best described as it occurs in rats on a diet in which deaminized casein is the only source of protein (ration 1, table 1) After a latent interval of about 10 to 15 days, during which time blood examination reveals little or nothing of an unusual character, there begin to appear anisocytosis, a moderate degree of reticulocytosis, and a considerable number of large, usually polychromasic cells frequently containing one or more

[1] Method of Osgood and Wilhelm (11)

[2] Newcomer hemoglobinometer

[3] The preparation and properties of this concentrate will be described in another publication.

Howell-Jollie bodies. The occurrence of polychromasic macrocytes with Howell-Jollie bodies, frequently before there is a definitely discernible degree of anemia judged by red cell counts and hemoglobin determinations, is such a constant and characteristic feature that we believe one can recognize and distinguish this type of anemia even in its early stages by a simple examination of a Wright-stained blood film. As the disease progresses, the anemia becomes more pronounced, the red cell count may fall to as low as 2 million or less and the hemoglobin to as low as 20 percent.[4] Frequently, however, animals die before the anemia reaches a severe stage.

The chief morphologic characteristic of this anemia in its more advanced forms is that it presents a great variety of abnormal cellular elements. There are poikilocytes, microcytes, macrocytes, polychromasic cells, erythroblasts of all sizes, frequently with irregularly shaped and fragmented nuclei, and numerous Howell-Jollie bodies varying in size up to that of a small nucleus. The reticulocyte count rises from the normal, which is usually less than 1 percent, to about 5 to 10 percent, with another rise to as high as 25 percent just before death. Immature forms of white blood cells, such as myelocytes and myeloblasts also occur in variable numbers. Many of the features of this anemia, such as the color index and the morphologic characteristics, indicate a macrocytic and usually hyperchromic anemia not unlike that of pernicious anemia. Table 2 gives a detailed account of the progress of this anemia in a series of rats on ration 1. The weight curve of these rats is shown in figure 4. Figures 1 to 3 illustrate its morphologic characteristics.

TABLE 2.—*Experimental anemia of deaminized casein (ration 1)*

Rat number	Days on ration	RBC	Hb	Reticulocytes
			Percent	*Percent*
233	11	7.20	48	1
	15	4.18	37	25
241	11	4.85	35	3
	17	3.12	33	5
	21	1.92	23	25
240	12	7.76	57	1
	17	2.40	20	5
242	12	6.24	53	1
	18	2.00	20	5
	22	1.99	20	21
239	17	9.04	73	3
	28	4.44	33	8
260	22	5.98	45	12
261	28	7.14	55	3
	40	4.40	47	19
263	29	2.88	30	9

[4] The normal blood of the rat contains about 10 million red cells per cubic millimeter, 90 to 100 hemoglobin, and less than 1 percent reticulocytes.

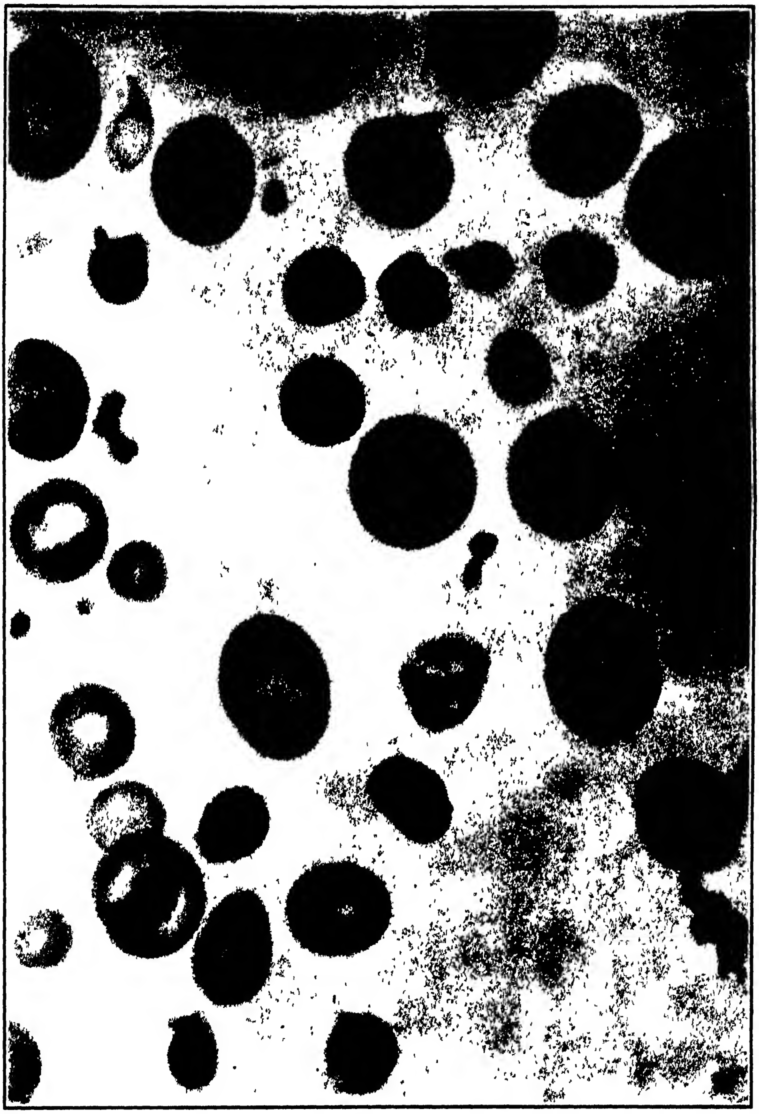


FIGURE 1.—Blood film of rat no. 233, 15 days on ration 1. Wright's stain, × 2,000

FIGURE 2. Another view of the blood film shown in fig. 1, showing megaloblasts, megalocyte, and multiple Howell-Jollie bodies.

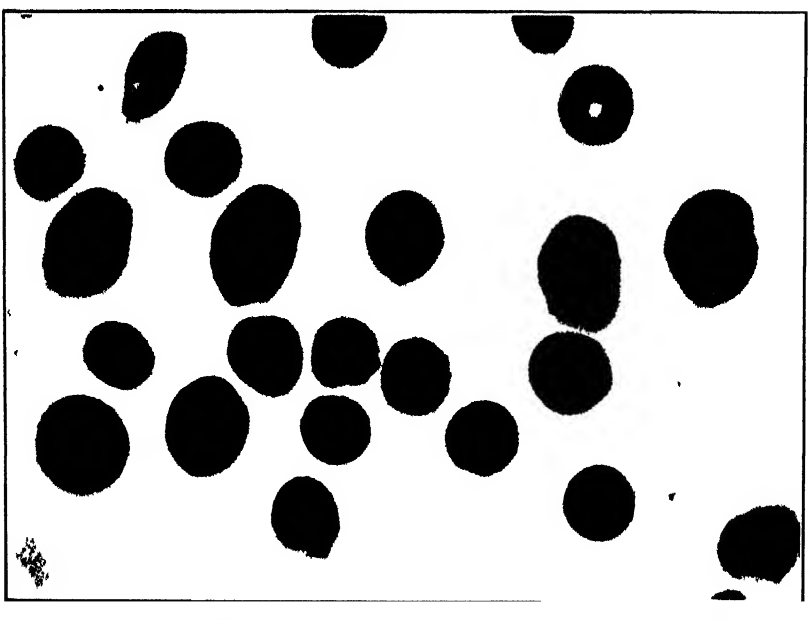


FIGURE 3. Blood film of rat no. 260, 22 days on ration 1. Reticulocyte stain, ×2,000.

Histologic examination of the abdominal and thoracic organs of several animals of this group made by Passed Assistant Surgeon J. G. Pasternack, of the National Institute of Health, revealed but little of an abnormal character. The bone marrow of these animals presented the appearance of slight hyperplasia, with evidence of moderately active erythropoiesis.

THE INFLUENCE OF SUPPLEMENTS

In the next series of experiments it was planned to determine whether supplementing the deaminized casein would have any effect upon the blood picture. In view of the fact that deaminized casein is known to be wholly lacking in lysine and partially deficient in tyrosine and histidine (3, 4, 5), a group of experiments was carried out in which these amino acids were added in amounts approximately equivalent to those present in casein when fed at the optimum level of 18 percent. Six rats were fed such a diet (ration 2, table 1). Three rats of this group died in 20 to 26 days, and the 3 that survived a somewhat longer period showed the characteristic anemia, though perhaps somewhat less severe than that of the former group. Inspection of table 3 and figure 4 clearly shows that the amino acids known to be lacking in deaminized casein neither afford any protection against the anemia nor improve its nutritive properties.

TABLE 3.—*Effect of lysine, tyrosine, and histidine supplements on the anemia of deaminized casein (ration 2)*

Rat number	Days on ration	RBC	Hb	Reticulocytes	Remarks
			Percent	*Percent*	
292	28	6.41	60	4	Died. Macrocytic anemia.
293	21				Died. Blood smear showed typical anemia.
294	20				Died.
295	26				Died
327	29	6 68	65	9	Typical macrocytic anemia.
329	21	4 26	40	8	Do.

In the succeeding four groups the deaminized casein was supplemented, respectively, with 5-percent dried brewers' yeast; 12-percent dried brewers' yeast; 5-percent casein and 5-percent dried brewers' yeast; and, lastly, with 15-percent casein and 5-percent dried brewers' yeast (rations 3, 4, 5, and 6). The results of these experiments are shown in table 4, indicating definitely that in no instance were any of the animals completely protected against the anemia. The results do seem to indicate, however, that on the more adequate diets, i. e., diets containing liberal protein other than the deaminized casein, the red blood cells and hemoglobin did not fall so rapidly nor to as low

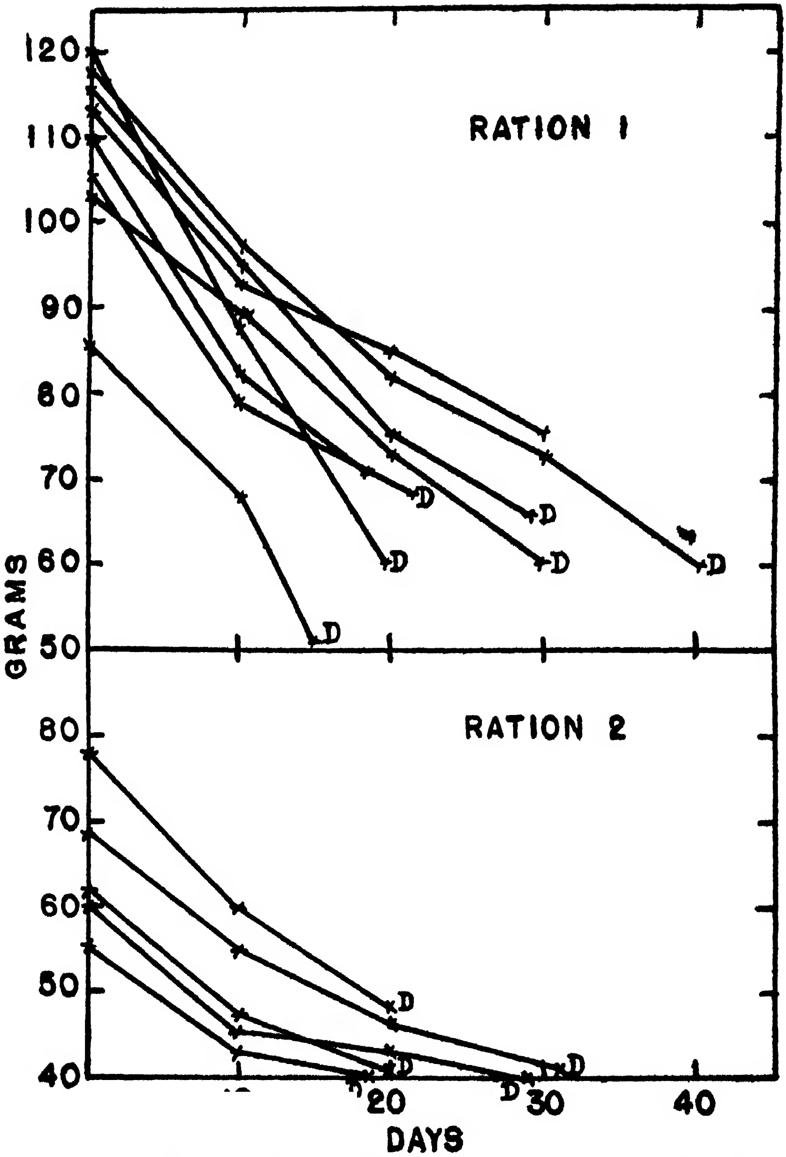


FIGURE 4.—Chart showing weight curves of rats on a diet of unsupplemented deaminised casein (ration 1) and on a diet supplemented with lysine, tyrosine, and histidine (ration 2).

a level as they did in the less adequately supplemented diets. It should be emphasized, however, that in no instance was the blood picture morphologically normal, even in the most adequately supplemented diets such as ration 6. Neither was the weight curve much better in the supplemented diets. (See figure 5.)

In one group of experiments (ration 4) the animals were taken off the anemia-producing diet after the anemia had fully developed and were placed on a normal adequate synthetic diet consisting of 18-percent casein, vitamins, salts, etc. (diet 242). Out of a group of

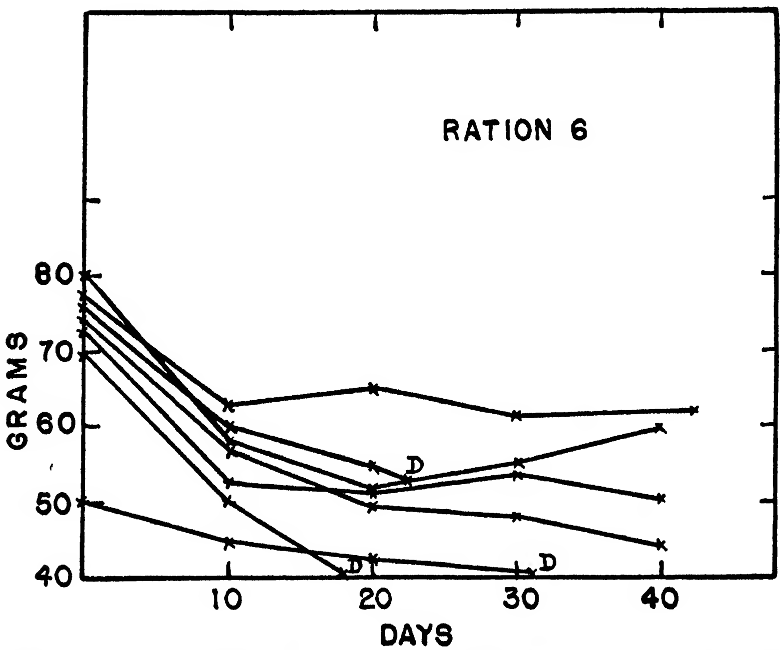


FIGURE 5.—Weight curves of rats on a diet of 10 percent deaminized casein supplemented with 15 percent casein.

six such rats, four showed good regeneration of red cells and hemoglobin, while two failed to recover and finally died.

We have also attempted to ascertain the response of this type of anemia to parenteral injection of liver extract. In a group of seven anemic rats, two on ration 1 and five on ration 5, liver extract [5] was injected intraperitoneally or intravenously daily in doses varying from 0.1 to 2.0 cc per kilo, over a period of from 3 to 8 days. No favorable effect was noted either on the reticulocytes or on the general blood picture. Indeed the treatment appeared to have no influence even in arresting the progress of the anemia.

[5] Eli Lilly Co.

TABLE 4.—*Effect of yeast and casein supplements on the anemia of deaminized casein*

Ration	Rat number	Days on ration	RBC	Hb	Reticulocytes	Remarks
				Percent	*Percent*	
3	1	21	------	20	--------	Died.
5-percent dried brewers' yeast.	2	23	2.18	20	--------	Chloroformed.
	3	22	2.84	23	--------	Do.
	4	22	------	------	--------	Died. Blood smear showed typically severe anemia.
4	248	24	2.56	35	3	Recovered in 2 weeks on diet 242.[1]
12-percent dried brewers' yeast.	250	24	5.33	57	2	Died while on ration 242.
	251	25	3.22	35	4	Recovered in 25 days on ration 242.
	254	25	3.03	30	2	Died while on ration 242.
	256	26	4.89	60	6	Recovered in 18 days on ration 242.
	257	23	3.84	45	6	Partial recovery in 16 days on ration 242.
5	279	44	6.46	60	1	
5-percent casein, and 5-percent dried brewers' yeast.	280	45	7.90	58	3	
	281	41	6.72	62	1	
	282	45	6.70	67	2	
	283	41	4.48	40	5	
6	1	24	------	------	--------	Died. Blood smear showed typically severe anemia.
15-percent casein, and 5-percent dried brewers' yeast.	2	29	6.80	72	4	Died.
	3	45	6.56	76	2	Characteristic anemia.
	4	17	7.00	64	1	Died. Blood smear showed typically moderate anemia.
	5	27	8.12	83	1	Anisocytosis, polychromatophilia, and few Howell-Jollie bodies.
	6	42	8.48	85	1	Anisocytosis, polychromatophilia, and Howell-Jollie bodies.
	7	40	7.20	82	5	Typical anemia.

[1] See text.

Our observations thus show that the same pathological process goes on whether or not the deaminized casein is supplemented with biologically adequate protein. Our experiments do indicate, however, that animals on a diet containing adequate protein in addition to deaminized casein seem to resist better the destructive effects of deaminized casein on the blood, possibly by permitting regeneration of new cells and hemoglobin, which might be less effective on a diet of inadequate protein. The nutritive failure of deaminized casein as judged by the weight curves and period of survival is not greatly improved by supplements of adequate protein. We believe that these results are susceptible of the following interpretation: First, the nutritive value of deaminized casein is low or nil; second, deaminized casein appears to contain an unidentified toxic factor highly specific for the blood elements. In view of the fact that a diet of deaminized casein, even if supplemented with adequate protein, is

frequently lethal in rats often before the blood shows profound changes, it seems probable that there may be still another toxic factor in deaminized casein, perhaps less specific than the one affecting the hematopoietic system. Obviously such a conclusion requires more direct proof. We therefore sought further evidence for this assumption in two directions: In the first place, we attempted to detoxify deaminized casein, and, second, we sought to prepare extracts of deaminized casein which, when injected parenterally into rats, would reproduce the characteristic blood picture just described.

THE DETOXIFICATION OF DEAMINIZED CASEIN

Various attempts at removal of the hypothetical toxic factor led to the observation that extraction of deaminized casein with methyl alcohol made alkaline with sodium hydroxide left a residue which, when fed to rats, no longer produced the anemia, or, if it did, it was of a very much milder form. As a result of many trials the most effective procedure appears to be the following: Suspend 25 gm of deaminized casein in about 400 cc CH_3OH containing 6 to 7 cc 9N NaOH (approximately 0.15 N NaOH in methyl alcohol) in an Erlenmyer flask and reflux on the water bath at 72°–75° C. 1 to 2 hours. Filter on a Buchner funnel and wash with CH_3OH till the reaction is neutral to litmus, then with ether and dry. This procedure removes not more than about 10 percent of the solids of deaminized casein.

Several groups of experiments were made with the foregoing residue fed at a level of 10 percent. In one group this constituted the only source of protein (ration 7, table 1). The rats in this group survived only from 19 to 28 days, clearly indicating that the protein was wholly inadequate. No evidence of anemia, however, was found in any of these animals. By way of control, a group of rats fed the residue of deaminized casein similarly extracted with 0.5 N HCl in CH_3OH (ration 8, table 1) showed the typical anemia within the survival period of 24 to 35 days.

In the succeeding experiment it was obviously necessary to include a source of protein other than deaminized casein. Two groups of experiments were therefore performed, one in which approximately 5 percent of yeast protein was included in the form of 12 percent dried brewers' yeast (ration 9), and the other in which 15 percent casein was included (ration 10), in addition to the "detoxified" deaminized casein. We have found from previous experience that a ration with 12 percent dried brewers' yeast as the only source of protein is a satisfactory maintenance diet, permitting even a slight degree of growth in the majority of young rats.

TABLE 5.—*Experiments showing the effect of feeding deaminized casein extracted by boiling with* $CH_3OH-NaOH$ *(ration 10)*

Rat number	Days on ration	RBC	Hb	Reticulocytes	Remarks
			Percent	*Percent*	
1	34	9.60	100	[1] ±	Morphologically negative.
2	32	9.63	88	±	Do.
3	33	9.14	88	±	Do.
4	33	9.90	90	±	Do.
5	36	9.98	84	±	Do.
6	36	8.18	78	±	Slight degree of anisocytosis and occasional Howell-Jollie body.
7	36	10.74	85	±	Morphologically negative.

[1] A fraction of 1 percent.

The results of these experiments are shown in table 5. All but one of seven rats on ration 10 presented a normal blood picture in from 32 to 36 days. Only one of the rats, no. 6, had a red cell count and hemoglobin slightly below normal. Morphologically the blood picture of this animal showed an occasional Howell-Jollie body and a slight degree of anisocytosis. The growth curve of the animals of this group, which may be seen in figure 6, indicates a very fair state of nutrition. The animals on ration 9, however, developed a moderate degree of anemia. These results seem to prove conclusively that the anemia-producing and growth-inhibiting factor or factors of deaminized casein are to a large extent removed or destroyed by boiling with alkaline methyl alcohol.

In an attempt to ascertain whether the detoxication was due to the removal or the destruction of the toxic factor or factors, the extracts were distilled *in vacuo*, and the residue was taken up in a small volume of water, neutralized with HCl, and dried on starch, which was then incorporated into a ration containing 12 percent dried brewers' yeast as the only source of protein for the first 3 weeks, and 6 percent the following 3 weeks. The extract was fed at a level corresponding to 10 percent deaminized casein. Two rats were kept on this diet, which furnished only the minimum amount of protein compatible with life and optimum conditions for the production of the experimental anemia. At the end of the experimental period the two rats presented a normal blood picture, with the red cell count 9.04 and 10.07 million per cubic millimeter, and hemoglobin 80 percent and 90 percent, respectively. Blood smears showed none of the characteristic features of the anemia. It may be concluded from this experiment that the hematoxic factor in the deaminized casein had not been extracted, but was largely destroyed by boiling with alkaline methyl alcohol.

Further evidence of the inactivation of the anemia-producing factor in deaminized casein by treatment with alkali was obtained in an experiment in which reprecipitated deaminized casein was fed to a

group of rats, and the solution in which the dissolved casein had been reprecipitated was concentrated to small volume and injected intraperitoneally in another group of rats with the result that neither developed the anemia.

This experiment was performed as follows: 50 grams of deaminized casein were gradually dissolved in the course of 3 days at room temperature in about 2 liters of approximately 0.15 N aqueous

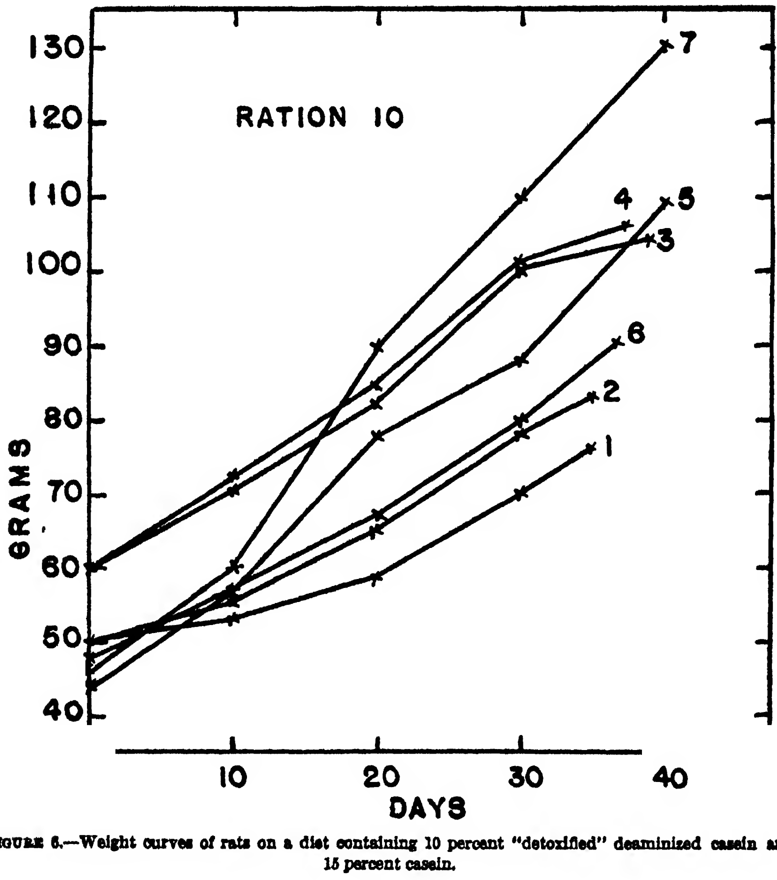


FIGURE 6.—Weight curves of rats on a diet containing 10 percent "detoxified" deaminized casein and 15 percent casein.

NaOH. The protein was then completely precipitated by the addition of about 300 cc N HCl. The precipitate was filtered off, washed, air dried, and incorporated in ration 11 (table 1). The solution was neutralized with NaOH to pH 6.4 and concentrated on the water bath so that each cubic centimeter represented the equivalent of 0.2 gm of deaminized casein, and this was injected daily intraperitoneally in a group of rats subsisting on a ration in which the only source of protein was 8 percent to 10 percent dried brewers' yeast. The results

of this experiment, shown in table 6, indicate that neither the reprecipitated casein nor the extract therefrom contained the anemia-producing factor in any appreciable amount. The weight curve of the animals on ration 11 is shown in figure 7.

TABLE 6.—*Effect of reprecipitation of deaminized casein on the anemia producing factor*

FEEDING OF REPRECIPITATED DEAMINIZED CASEIN (RATION 11)

Rat number	Grams	Days	RBC	Hb	Reticulocytes	Remarks
				Percent	*Percent*	
1	124	38	10.14	80	0 3	Anisocytosis, macrocytes and some Howell-Jollie bodies.
2	100	37	8.02	92		Morphologically negative.
3	92	30	8 72	90	.5	Few macrocytes and occasional Howell-Jollie body.

INTRAPERITONEAL INJECTIONS OF CONCENTRATED SOLUTION FROM WHICH DEAMINIZED CASEIN WAS PRECIPITATED

Rat number	Grams	Days	RBC	Hb	Reticulocytes	Remarks
1	86	37	10 22	70	3 0	Some anisocytosis.
2	96	37	9.44	80	1 0	Few macrocytes.
3	60	36	8.27	78	.5	Negative.

AN ATTEMPT TO PRODUCE THE EXPERIMENTAL ANEMIA BY THE PARENTERAL ADMINISTRATION OF EXTRACTS OF DEAMINIZED CASEIN

It should be apparent from the foregoing experiments that the anemia of deaminized casein is an intoxication and not a deficiency disease. With a view to identifying this interesting substance, various extracts of deaminized casein suitable for parenteral injection were prepared and their effects on the blood picture studied. We were guided in these experiments by the following considerations, which were established in the foregoing feeding experiments:

1. The anemia occurs only after a feeding period of not less than 2 to 3 weeks.

2. The intoxication results from the ingestion of about 0.5 gm of deaminized casein per day; hence it was aimed insofar as possible to have its equivalent per cc of extract as a suitable dose for injection.

3. The optimum ration for demonstrating the blood changes of deaminized casein is one containing a minimum of protein of good quality. The extracts were therefore injected intraperitoneally into young rats of 60–80 grams kept on a ration containing 8 percent dried brewers' yeast as the only source of protein.

4. Since alkali appears to have a destructive effect upon the unidentified anemia-producing factor, only neutral or acid extractions were attempted.

It would not be profitable to go into a detailed discussion of the various experiments carried out in an attempt to obtain an active extract. Suffice it to say that we have found no way of recovering the toxic factor short of relatively drastic hydrolysis of the deaminized casein with hydrochloric acid. Aqueous and alcoholic extracts made by refluxing deaminized casein with the solvents and subsequent concentration proved entirely inactive. An extract prepared by mild partial hydrolysis of deaminized casein with 20

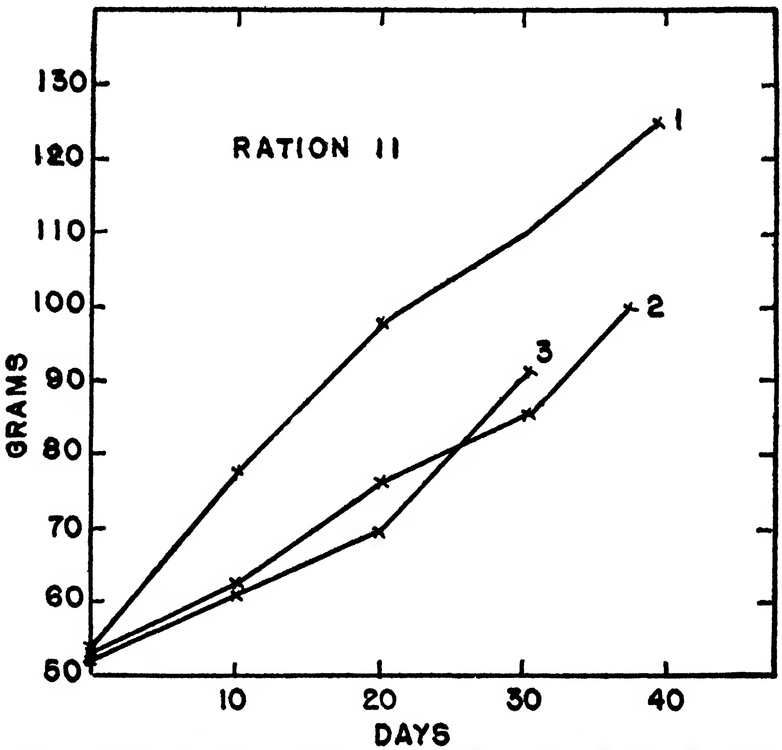


FIGURE 7.—Weight curves of rats on a diet containing 10 percent reprecipitated deaminized casein and 15 percent casein.

volumes 0.1 N aqueous hydrochloric acid by refluxing for 1 hour, subsequently neutralized and concentrated to represent the equivalent of 0.2 gm of deaminized casein per cc showed only some anisocytosis, and polychromasia after daily intraperitoneal injections of 1 cc over a period of 40 days.[6] The red cell count and hemoglobin remained normal throughout. The residual deaminized casein was fed to rats and it produced the anemia in the usual manner. This would seem to indicate that the toxic factor is so firmly bound to the protein

[6] Actually this extract contained only about 20 mg per cc for not more than 10 percent of the solids of deaminized casein had been removed by this procedure

molecule that it could not be liberated without the more or less complete disintegration of the protein.

The daily intraperitoneal injection of a nearly complete hydrochloric acid hydrolysate of deaminized casein gave us definitely positive results, though not as uniformly as might be wished. Lack of uniformity, we believe, is due to the fact that such hydrolysates proved considerably toxic, and we were limited to relatively small doses. It is also quite possible, if not probable, that some destruction of the toxic factor had taken place in the course of the preparation of such hydrolysates.[7]

The following procedures were used for the preparation of partially active hydrochloric acid hydrolysates:

1. Ten grams of deaminized casein were refluxed by gentle boiling for 3 hours with 100 cc of 1 part concentrated hydrochloric acid to 5 parts water. A small residue was centrifuged off, and the solution was adjusted with NaOH to pH 6.4 and the total volume brought up to 130 cc; thus each cc represented approximately 75 mg of deaminized casein. This, though apparently quite irritating on intraperitoneal injection, was well tolerated in 1-cc doses injected repeatedly.

2. Thirty grams of deaminized casein were refluxed with 300 cc of hydrochloric acid as above. The centrifugated hydrolysate was distilled on the water bath under reduced pressure to remove excess HCl, the residue was taken up in water, adjusted to pH 6.4 with NaOH, and made up to a total volume of 100 cc. Of this hydrolysate not more than 0.5 cc, or the equivalent of 150 mg of deaminized casein, was tolerated. Repeated injections of this preparation proved too toxic for continued observation.

In view of the toxic nature of this hydrolysate, an attempt was made to fractionate it with ethyl alcohol into an alcohol soluble and an alcohol insoluble fraction. A similar hydrolysate was therefore prepared and was precipitated with 8 volumes of absolute alcohol and separated by centrifugation into the following:

2A. The clear alcoholic solution was evaporated on the water bath and the residue dissolved in a volume of water to represent the equivalent of 0.3 gm of deaminized casein per cc. This solution, in general, presented the same acute toxicity characteristics as did the preceding hydrolysate, though it was tolerated in doses up to 0.8 to 1.0 cc injected repeatedly.

[7] A sulphuric acid hydrolysate injected daily intraperitoneally in 1-cc doses containing the equivalent of 0.4 gm deaminized casein was without effect on the blood picture of rats after 30 such injections. It also appeared to be wholly free from any toxic effects. This hydrolysate was made by gently refluxing deaminized casein with 5 volumes of 25 percent H_2SO_4 for 3 hours. After centrifuging off a small amount of undigested material, the excess sulphuric acid was removed with powdered $Ba(OH)_2$ and the pH of the solution adjusted with NaOH to about 6.6, and finally the solution was concentrated on the water bath. It would seem that the toxic factor was either destroyed or possibly lost in the Ba precipitate.

2B. The alcohol insoluble precipitate was freed *in vacuo* of all traces of alcohol and the residue dissolved in water to represent the equivalent of 0.3 gm of deaminized casein per cc. This material was free from any acute toxic effects and was well tolerated in 1-cc doses.

TABLE 7.—*Effect of intraperitoneal injections of hydrolysates of deaminized casein*

Hydrolysate number	Rat number	Grams	Injections	Equivalent of deaminized casein	RBC	Hb	Reticulocytes	Wright's blood film
				Mg		*Per cent*	*Per cent*	
1	1	64	26	75	6.20	65	2	Typically moderate macrocytic anemia, numerous Howell-Jollie bodies.
	2	56	31	75	9.36	72	.5	Negative.
	3	90	33	75	7.96	80	2	Anisocytosis, macrocytes, polychromasia, few Howell-Jollie bodies.
2A	1	64	20	240	7.81	80	------	Anisocytosis, polychromasia, numerous macrocytes, Howell-Jollie bodies, and nucleated red cells. Died.
	2	60	20	240	8.54	84	2	Anisocytosis, myeloblasts, and macrocytes. Died.
	3	64	26	240	7.73	62	------	Anisocytosis, some macrocytes, and few Howell-Jollie bodies. Died.
	4	64	29	240	6.27	66	2	Anisocytosis, macrocytes, myeloblasts, and occasional Howell-Jollie bodies. Died.
	5	64	34	240	7.96	70	3	Do.
	6	72	13	240	7.53	75	4	Anisocytosis, macrocytes, polychromasia, myeloblasts, and few Howell-Jollie bodies and macroblasts.
	7	61	13	240	7.15	72	8	Do.
	8	66	24	240	6.70	58	6	Anisocytosis, polychromasia, macrocytes.
2B	1	34	19	300	4.30	35	4	Anisocytosis, polychromasia, some macrocytes, nucleated red cells, and few Howell-Jollie bodies.
	2	48	26	300	6.98	60	------	Anisocytosis, polychromasia, myeloblasts, and some macrocytes.
	3	70	32	300	8.48	67	2	Anisocytosis, macrocytes, few Howell-Jollie bodies.
	4	70	33	300	8.16	64	3	Anisocytosis, polychromasia, and some macrocytes.
	5	62	21	300	6.41	55	1	Anisocytosis. Died.

The results of the tests with these three preparations are shown in table 7. Though for the most part no more than a very moderate degree of anemia could be produced at best, as judged by the red cell count and hemoglobin determinations, nevertheless the very definite morphologic changes in the blood picture of the majority of the animals leads us to believe that this furnishes direct conclusive evidence of the toxic nature of the anemia of deaminized casein. It seems almost certain that had it been possible to administer the toxic factor in higher concentration, a more uniformly severer anemia would have been produced.

Regarding the chemical properties of the toxic factor, but little can be said. It seems certain that it is unstable in alkali. Partial or even complete destruction in strong acid seems likely. Its solubility in ethyl alcohol is indicated from the experiments 2A and 2B, detailed in

table 7; for, though both fractions produced anemia, the alcohol soluble fraction gave the more decisively characteristic blood picture of deaminized casein.

CONCLUSIONS

Deaminized casein has little, if any, nutritional value in the nutrition of the white rat.

When fed at a level of 10 percent, deaminized casein produces in the white rat a characteristic macrocytic megaloblastic anemia with many Howell-Jollie bodies. The inclusion of good quality protein does not prevent the pathological process, though it mitigates the severity of the anemia.

Boiling deaminized casein with alcoholic sodium hydroxide, or reprecipitation of deaminized casein from aqueous alkaline solution, destroys the anemia-producing factor to a considerable extent.

The intraperitoneal injection of the alcohol soluble fraction of a hydrochloric acid hydrolysate of deaminized casein reproduced the anemia sufficiently definitely to prove conclusively that the anemia is an intoxication and not a deficiency disease.

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NEW METHOD OF DETERMINING PLAGUE INFECTION IN RODENTS

A method of determining plague infection among wild rodents, based on mass inoculation, which holds promise of being of considerable practical value, has been reported by Surg. C. R. Eskey, in charge of the United States Public Health Service plague laboratory in San Francisco. Surgeon Eskey makes the following interesting report and comment on the procedure:

The fleas taken from ground squirrels shot in Elko County, Nev., on May 7 were placed in a small vial containing normal salt solution and sent to the laboratory in San Francisco. They arrived on May 11 and were then placed in clean salt solution in a mortar, ground up into an emulsion, and inoculated subcutaneously into a guinea pig. The guinea pig was found dead on the fifth day, and, upon autopsy,

presented the typical macroscopic pathology of plague. The microscopic examination of smears revealed large numbers of typical bipolar staining coccobacilli. A second guinea pig inoculated cutaneously died on the tenth day, and also presented the findings of plague infection. The cultures obtained from the first guinea pig were those of *Pasteurella pestis.*

The method used in discovering plague in this instance promises to be a valuable means of locating plague among wild rodents. It is comparable to the use of mass inoculation of animal tissue, but it is believed that even better results can be obtained with fleas. When only one piece of animal tissue used in mass inoculation is plague-infected, it is so diluted by the mixture of uninfected tissue that no organisms may be present in the portion used for inoculation, whereas in the case of fleas, if only one is infected it will be injected into the guinea pig, as all of the fleas are used. Plague cannot exist among rodents without the infection being present in the fleas they harbor; and, therefore, when the disease is present, the use of fleas for locating infection appears logical. Neither mass inoculation nor inspection of animals for suspicious lesions of plague will reveal the infection during the incubation period or in the early stages of infection when the infected fleas might be collected from the animals. When ground squirrels are obtained by shooting them, very few infected animals are ever found except in areas where a very virulent epizootic is occurring at the time when the animals are obtained.

DEATHS DURING WEEK ENDED MAY 23, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 23, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	8,387	8,351
Deaths per 1,000 population, annual basis	11.7	11.6
Deaths under 1 year of age	589	531
Deaths under 1 year of age per 1,000 estimated live births	53	49
Deaths per 1,000 population, annual basis, first 21 weeks of year	13.4	12.5
Data from industrial insurance companies:		
Policies in force	68,290,456	67,771,202
Number of death claims	13,588	13,094
Death claims per 1,000 policies in force, annual rate	10.4	10.1
Death claims per 1,000 policies, first 21 weeks of year, annual rate	10.8	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended May 30, 1936, and June 1, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 30, 1936, and June 1, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935
New England States:								
Maine	2	4	2		315	280	1	0
New Hampshire		1			8		1	0
Vermont					183	14	0	0
Massachusetts	5	9			1,125	376	7	8
Rhode Island	3			3	40	452	2	2
Connecticut	2	7	1		203	592	0	0
Middle Atlantic States:								
New York	45	28	[1] 12	[1] 4	2,430	2,475	6	23
New Jersey	9	11	4	9	376	1,931	3	6
Pennsylvania	30	18			1,560	2,168	12	9
East North Central States:								
Ohio	27	32	22	62	608	2,032	6	14
Indiana	7	24	14	9	15	215	3	0
Illinois [2]	33	42	27	15	21	1,413	5	16
Michigan	4	7	2	3	75	2,648	4	2
Wisconsin	1	5	24	36	209	1,481	2	0
West North Central States.								
Minnesota	7	10		2	419	279	1	0
Iowa	2	11			5	204	0	0
Missouri	5	20	36	37	14	333	2	8
North Dakota			5	4	1	47	1	0
South Dakota	3	4		1		24	0	0
Nebraska	2	19	5	1	64	343	0	1
Kansas	4	3			5	545	0	3
South Atlantic States:								
Delaware		2			17	10	0	0
Maryland [3]	6	3	4	1	366	74	4	0
District of Columbia	9	13		1	148	28	0	6
Virginia	10	10	50		72	380	10	2
West Virginia	5	9	35	11	48	305	8	3
North Carolina	11	7	3	2	41	74	4	3
South Carolina	2	3	73	88	65	1	1	1
Georgia [4]	3	1					4	0
Florida		4	4	1	18	20	6	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 30, 1936, and June 1, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935
East South Central States:								
Kentucky	3	3	2	5	23	105	32	5
Tennessee	8	4	32	8	35	41	5	3
Alabama [4]	12	10	43	18	3	103	3	0
Mississippi [3]	6	5					0	2
West South Central States:								
Arkansas	2	5	54	28	4	81	0	1
Louisiana	3	15	6	4	32	38	1	1
Oklahoma [5]	8	11	33	31	8	49	0	1
Texas [4]	30	32	100	45	280	53	8	3
Mountain States:								
Montana [2]				44	8	282	1	1
Idaho [2]					16	8	1	0
Wyoming [2]					1	23	0	1
Colorado [2]	5	13			44	506	0	0
New Mexico	2	6	6	9	68	14	0	3
Arizona		2	37	6	111	53	1	4
Utah [2] [3]					19	2	0	0
Pacific States:								
Washington		1	9		339	461	0	1
Oregon [2]	1		11	15	102	215	1	4
California	36	21	82	27	1,567	1,281	2	7
Total	353	435	738	530	11,111	22,065	148	139
First 22 weeks of year	11,692	13,910	136,520	100,639	218,257	598,436	5,020	3,134

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935
New England States:								
Maine	0	1	10	13	0	0	1	2
New Hampshire	0	0	2	20	0	0	0	0
Vermont	0	0	6	4	0	0	0	0
Massachusetts	8	0	179	246	0	0	5	3
Rhode Island	0	0	23	15	0	0	0	1
Connecticut	0	0	17	96	0	0	2	2
Middle Atlantic States:								
New York	1	1	610	959	0	0	2	7
New Jersey	0	2	226	157	0	0	1	3
Pennsylvania	1	0	342	338	0	0	6	7
East North Central States:								
Ohio	0	0	210	560	0	0	5	7
Indiana	0	0	88	89	0	0	1	7
Illinois [2]	0	1	412	1,138	20	4	4	6
Michigan	0	1	287	268	0	0	2	5
Wisconsin	0	0	310	456	1	9	0	1
West North Central States:								
Minnesota	0	1	249	276	3	16	0	3
Iowa	1	1	154	68	42	3	0	0
Missouri	0	0	91	48	7	4	1	8
North Dakota	0	0	16	40	11	0	2	2
South Dakota	0	0	26	12	20	5	0	0
Nebraska	0	0	72	38	14	53	0	4
Kansas	0	0	154	39	9	22	0	7

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 30, 1936, and June 1, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935	Week ended May 30, 1936	Week ended June 1, 1935
South Atlantic States:								
Delaware	0	0	1	6	0	0	0	0
Maryland [3]	0	0	38	76	0	0	0	4
District of Columbia	0	0	20	31	0	0	0	0
Virginia	0	2	45	20	0	0	15	13
West Virginia	1	1	40	58	0	0	5	6
North Carolina	2	25	18	14	1	0	7	5
South Carolina	0	1	4	1	0	0	2	16
Georgia [4]	0	1	10	2	0	0	7	3
Florida	0	1	4	4	0	0	0	2
East South Central States:								
Kentucky	0	0	17	24	0	0	6	3
Tennessee	1	0	10	18	3	0	3	11
Alabama [4]	0	2	2	7	0	0	4	7
Mississippi [3]	0	1	9	5	0	0	2	4
West South Central States:								
Arkansas	0	0	4	1	0	2	3	6
Louisiana	0	4	6	7	0	0	10	6
Oklahoma [5]	0	0	26	6	4	3	6	5
Texas [4]	0	0	50	28	13	24	7	10
Mountain States:								
Montana [2]	0	0	54	6	7	0	1	6
Idaho [2]	0	0	12	3	3	0	0	0
Wyoming [2]	0	0	23	8	33	5	0	0
Colorado [2]	0	0	51	172	2	3	1	0
New Mexico	1	0	35	9	0	1	1	3
Arizona	0	1	20	41	0	0	2	3
Utah [2] [3]	0	0	39	117	2	0	1	0
Pacific States:								
Washington	0	0	82	56	3	21	1	2
Oregon [2]	0	0	25	23	0	2	2	3
California	5	3	300	211	0	10	9	5
Total	21	50	4,379	5,834	108	187	127	197
First 22 weeks of year	402	565	160,216	155,197	5,032	4,168	2,582	3,108

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended May 30, 1936, 13 cases, as follows: Illinois, 1; Montana, 5; Idaho, 2; Wyoming, 2; Colorado, 1; Utah, 1; Oregon, 1.
[3] Week ended earlier than Saturday.
[4] Typhus fever, week ended May 30, 1936, 16 cases, as follows: Georgia, 8; Alabama, 7; Texas, 1.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March 1936										
Puerto Rico	-------	56	3,276	982	38	3	0	-------	0	32
April 1936										
Missouri	26	88	3,808	47	115	-------	0	963	58	6
Montana	9	21	197	-------	53	-------	1	380	42	3
New York	91	170	-------	10	12,974	-------	4	4,292	0	32
North Dakota	1	5	38	-------	4	-------	0	195	34	4
Vermont	-------	4	-------	-------	2,786	-------	0	31	0	1
Virginia	43	55	1,189	9	568	17	2	212	2	13
Washington	8	3	69	-------	1,637	-------	1	388	47	6
Wisconsin	13	11	255	-------	510	-------	1	2,681	34	11

Summary of monthly reports from States—Continued

	Cases
March 1936	
Puerto Rico:	
Chicken pox	69
Dysentery	19
Mumps	51
Ophthalmia neonatorum	6
Tetanus	18
Tetanus, infantile	3
Whooping cough	54
April 1936	
Chicken pox:	
Missouri	235
Montana	21
New York	2,348
North Dakota	38
Vermont	127
Virginia	246
Washington	344
Wisconsin	1,625
Conjunctivitis:	
Washington	2
Dysentery:	
New York (amoebic)	7
New York (bacillary)	14
Virginia (diarrhea included)	28
Washington (amoebic)	1
Washington (bacillary)	1
Epidemic encephalitis:	
Missouri	2
New York	11
Virginia	2
April 1936—Continued	
Epidemic encephalitis—Continued.	
Washington	2
Wisconsin	2
German measles:	
Montana	6
New York	969
Vermont	60
Washington	485
Wisconsin	194
Mumps:	
Missouri	656
Montana	366
North Dakota	114
Vermont	98
Virginia	362
Washington	400
Wisconsin	4,329
Ophthalmia neonatorum:	
New York [1]	10
Paratyphoid fever:	
New York	1
Rabies in animals:	
Missouri	9
New York [1]	10
Washington	5
Rocky Mountain spotted fever:	
Montana	18
Septic sore throat:	
Missouri	53
Montana	11
New York	65
Virginia	9
April 1936—Continued	
Septic sore throat—Con.	
Washington	5
Wisconsin	16
Tetanus:	
New York	2
Virginia	1
Trachoma:	
Missouri	58
Montana	9
North Dakota	2
Washington	1
Wisconsin	2
Trichinosis:	
New York	8
Typhus fever:	
New York	2
Undulant fever:	
Missouri	1
New York	16
Washington	6
Wisconsin	6
Vincent's infection:	
New York [1]	75
North Dakota	1
Whooping cough:	
Missouri	83
Montana	42
New York	944
North Dakota	4
Vermont	79
Virginia	137
Washington	173
Wisconsin	780

[1] Exclusive of New York City.

PLAGUE-INFECTED GROUND SQUIRRELS IN ELKO COUNTY, NEV.

Plague infection has been reported in ground squirrels, *Citellus elegans*, shot on May 7, 1936, on a sheep ranch located 8 miles northeast of Lamoille, Elko County, Nev. The infection was determined by inoculating guinea pigs with fleas taken from 50 ground squirrels. It was said that several hundred ground squirrels had previously been examined for plague in this region, but none had been found with suspicious lesions. (See p. 786 for a description of the method used.)

WEEKLY REPORTS FROM CITIES

City reports for week ended May 23, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross-section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	213	2	1	0	0	0	5	22
New Hampshire:											
Concord	0	------	0	0	1	1	0	2	0	0	7
Nashua	0	------	------	47	0	1	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	66	0	0	0	0	0	0	8
Rutland	0	------	0	16	0	0	0	0	0	0	4
Massachusetts:											
Boston	4	------	1	332	16	51	0	10	1	30	226
Fall River	0	------	0	3	1	4	0	2	0	0	33
Springfield	0	------	0	1	1	3	0	3	0	1	36
Worcester	0	------	0	155	1	5	0	3	2	9	45
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	------
Providence	0	------	0	25	2	18	0	3	0	2	67
Connecticut:											
Bridgeport	0	------	0	4	2	3	0	0	0	4	27
Hartford	0	------	0	1	7	3	0	2	0	1	71
New Haven	0	1	0	0	2	0	0	0	0	35	40
New York:											
Buffalo	0	------	0	75	19	56	0	8	0	7	146
New York	29	------	3	1,959	110	333	0	106	2	78	1,536
Rochester	0	------	0	7	3	3	0	2	0	0	64
Syracuse	0	------	0	113	5	10	0	2	0	10	45
New Jersey:											
Camden	1	------	0	10	2	4	0	1	0	0	33
Newark	0	------	0	13	8	60	0	9	0	29	108
Trenton	0	------	0	0	4	12	0	0	0	3	37
Pennsylvania:											
Philadelphia	5	1	1	563	83	73	0	27	0	61	487
Pittsburgh	2	3	2	18	40	126	0	5	0	35	180
Reading	0	------	0	26	6	1	0	0	0	1	25
Scranton	1	------	------	0	------	4	0	------	0	0	------
Ohio:											
Cincinnati	1	------	0	14	------	26	0	1	0	2	101
Cleveland	3	6	0	151	12	51	0	10	1	121	179
Columbus	0	------	0	1	4	4	0	0	0	6	77
Toledo	1	------	0	32	7	3	0	3	0	27	82
Indiana:											
Anderson	0	------	1	0	0	8	0	0	0	0	10
Fort Wayne	0	------	0	0	3	9	0	0	0	0	27
Indianapolis	0	------	0	1	15	30	0	2	0	11	100
South Bend	0	------	0	0	2	2	0	1	0	2	12
Terre Haute	3	------	0	0	0	2	0	0	0	0	17
Illinois:											
Alton	1	------	0	0	0	11	0	0	0	3	7
Chicago	17	------	3	10	55	167	0	31	0	102	709
Elgin	0	------	0	1	2	1	0	0	0	1	13
Moline	1	------	0	0	1	3	0	0	0	1	8
Springfield	0	------	0	0	2	9	0	0	0	1	18
Michigan:											
Detroit	7	2	0	26	20	138	0	19	2	296	281
Flint	1	------	0	1	5	12	0	0	0	2	35
Grand Rapids	0	------	0	2	1	7	0	1	0	1	41
Wisconsin:											
Kenosha	0	------	0	1	1	3	0	0	0	0	9
Milwaukee	0	1	1	12	8	98	0	1	1	91	95
Racine	0	------	0	3	1	3	0	0	0	3	13
Superior	0	------	0	1	0	18	0	0	0	0	8
Minnesota:											
Duluth	0	------	0	7	3	20	0	1	0	10	27
Minneapolis	1	------	2	195	4	56	0	2	0	10	112
St. Paul	0	------	0	137	8	27	0	5	0	4	64
Iowa:											
Cedar Rapids	0	------	------	0	------	2	0	------	0	3	------
Davenport	1	------	------	0	------	13	0	------	0	0	------
Des Moines	0	------	------	2	------	16	10	------	0	0	29
Sioux City	0	------	------	0	------	9	31	------	0	2	------
Waterloo	0	------	------	2	------	5	0	------	0	0	------

City reports for week ended May 23, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Missouri:											
Kansas City	2	------	1	2	5	78	0	10	0	1	88
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	9	------	3	4	7	54	0	13	0	9	192
North Dakota:											
Fargo	0	------	0	0	2	2	0	0	0	0	9
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	2	0	23	0	0	0	0	5
South Dakota:											
Aberdeen	0	------	------	0	------	7	0	------	0	0	------
Nebraska:											
Omaha	0	------	0	13	8	30	2	0	0	0	47
Kansas:											
Lawrence	0	------	1	1	0	0	0	0	0	0	11
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	------	0	0	4	19	1	2	0	1	29
Delaware:											
Wilmington	0	------	0	2	1	1	0	0	0	7	23
Maryland:											
Baltimore	0	4	0	285	16	18	0	8	1	61	200
Cumberland	0	------	0	0	1	0	0	0	0	0	9
Frederick	0	------	0	0	1	1	0	0	0	0	3
District of Columbia:											
Washington	19	1	1	161	12	17	0	19	0	24	152
Virginia:											
Lynchburg	0	------	0	2	4	0	0	0	0	10	6
Norfolk	1	1	------	0	1	2	0	1	0	3	24
Richmond	1	------	1	2	6	18	0	1	2	0	48
Roanoke	0	------	0	0	1	0	0	1	0	0	15
West Virginia:											
Charleston	0	1	0	0	1	0	0	0	0	0	18
Huntington	0	------	0	0	0	0	0	0	0	0	------
Wheeling	0	------	0	42	2	3	0	1	1	4	14
North Carolina:											
Gastonia	0	------	0	0	1	0	0	0	0	0	7
Raleigh	------	------	------	------	------	------	------	------	------	------	------
Wilmington	0	------	0	0	0	0	0	1	0	0	11
Winston-Salem	0	1	0	15	1	0	0	0	0	0	16
South Carolina:											
Charleston	0	5	0	0	2	0	0	2	1	1	21
Columbia	0	------	0	0	0	0	0	0	0	0	4
Florence	0	------	0	0	0	0	0	0	0	0	------
Georgia:											
Atlanta	2	6	1	0	13	6	0	7	0	1	97
Brunswick	0	------	0	0	0	0	0	0	0	0	4
Savannah	0	1	1	0	0	0	0	1	1	0	26
Florida:											
Miami	0	1	0	16	1	0	0	2	0	20	23
Tampa	0	------	0	8	2	0	0	1	0	0	24
Kentucky:											
Ashland	0	------	0	0	0	0	0	0	0	1	4
Covington	0	------	0	2	0	0	0	4	0	0	18
Louisville	1	------	0	87	7	13	0	5	0	9	67
Tennessee:											
Knoxville	2	------	0	10	3	0	0	1	0	0	32
Memphis	0	------	0	0	5	6	0	5	0	16	98
Nashville	0	------	2	8	3	2	0	3	0	1	45
Alabama:											
Birmingham	0	2	0	3	8	0	0	4	0	0	60
Mobile	1	------	1	0	0	1	0	3	0	0	21
Montgomery	0	------	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	2	0	------	2	0	------
Little Rock	0	------	1	1	3	1	0	1	0	0	5
Louisiana:											
Lake Charles	0	------	0	1	0	0	0	0	1	0	------
New Orleans	7	13	4	27	16	4	0	14	1	85	152
Shreveport	0	------	0	7	2	0	0	1	0	0	40
Oklahoma:											
Oklahoma City	3	10	1	2	4	11	0	0	0	2	45
Tulsa	0	------	------	1	------	3	0	------	0	3	------
Texas:											
Dallas	2	2	2	85	4	0	0	5	0	4	75
Fort Worth	1	------	0	1	1	2	0	3	0	0	34
Galveston	0	------	0	4	1	1	0	2	0	0	12
Houston	4	------	1	1	10	8	0	6	1	0	72
San Antonio	2	------	2	8	9	0	0	8	1	0	97

City reports for week ended May 23, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	1	------	0	0	2	3	0	0	0	0	5
Great Falls	0	------	0	0	5	6	1	0	0	4	10
Helena	0	------	0	0	0	1	1	0	0	0	3
Missoula	0	------	0	0	0	7	0	0	0	0	3
Idaho:											
Boise	0	------	0	3	0	1	0	0	0	0	7
Colorado:											
Colorado Springs	0	------	0	1	2	8	0	0	0	0	10
Denver	3	------	0	35	9	18	0	3	2	34	84
Pueblo	0	------	0	0	0	15	0	1	0	1	10
New Mexico:											
Albuquerque	1	1	0	9	1	16	0	0	0	1	7
Utah:											
Salt Lake City	0	------	0	20	4	26	2	1	0	14	86
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	1	210	9	3	1	4	0	6	86
Spokane	0	------	0	9	2	18	0	0	0	8	35
Tacoma	0	------	0	23	1	4	0	0	0	3	30
Oregon:											
Portland	0	------	0	4	6	5	0	1	0	13	58
Salem	0	3	------	9	------	0	1	------	0	0	------
California:											
Los Angeles	8	13	1	281	12	34	0	25	1	59	300
Sacramento	1	------	0	2	0	9	0	2	1	15	26
San Francisco	2	------	0	145	8	70	0	10	0	39	163

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				District of Columbia:			
Boston	3	3	3	Washington	4	2	0
New York:				Virginia:			
Buffalo	0	1	0	Lynchburg	1	0	0
New York	15	5	0	Richmond	0	1	0
New Jersey:				West Virginia:			
Newark	0	2	0	Huntington	1	0	0
Pennsylvania:				Wheeling	1	0	0
Philadelphia	2	0	0	Georgia:			
Ohio:				Atlanta	1	2	0
Cincinnati	3	0	0	Savannah	1	0	0
Cleveland	1	0	0	Kentucky:			
Toledo	1	1	0	Ashland	0	1	0
Indiana:				Louisville	0	1	0
Indianapolis	2	0	0	Tennessee:			
Illinois:				Knoxville	0	1	0
Chicago	6	2	0	Memphis	1	0	0
Michigan:				Louisiana:			
Detroit	1	0	0	New Orleans	1	0	0
Minnesota:				Oklahoma:			
Minneapolis	2	1	0	Oklahoma City	1	0	0
Iowa:				Texas:			
Des Moines	0	0	1	Dallas	1	0	0
Missouri:				California:			
St. Louis	1	0	0	Los Angeles	3	2	2
Maryland:							
Baltimore	3	0	0				

Epidemic encephalitis.—Cases: Pittsburgh, 1; Charleston, S. C., 1.

Pellagra.—Cases: Winston-Salem, 4; Charleston, S. C., 1; Savannah, 1; Louisville, 1; Birmingham, 1; Dallas, 1; Los Angeles, 1.

Typhus fever.—Cases: Montgomery, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended May 16, 1936.—During the 2 weeks ended May 16, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				3	2		1		2	8
Chicken pox		5	9	160	334	43	44	31	125	751
Diphtheria		6	3	43	7	3	5	1		68
Dysentery					1					1
Erysipelas		1		12	3	5	7	2	6	36
Influenza		13	2		15		22		58	110
Measles		26	24	1,099	3,531	406	587	201	1,437	7,311
Mumps		1			759	98	118	24	165	1,165
Paratyphoid fever					1					1
Pneumonia		6			27		3		11	47
Poliomyelitis						1	1			2
Scarlet fever		35	5	191	275	113	24	54	33	730
Smallpox								5		5
Trachoma							2			2
Tuberculosis	12	5	33	173	135	13	27		24	422
Typhoid fever		1	1	25	3			1		31
Undulant fever					9	1				10
Whooping cough		7	1	63	302	9	60	3	81	526

DENMARK

Communicable diseases—January—March 1936.—During the months of January, February, and March 1936, certain communicable diseases were reported in Denmark as follows:

Disease	January	February	March	Disease	January	February	March
Cerebrospinal meningitis	4	9	3	Paradysentery	11	52	44
Chicken pox	92	114	159	Paratyphoid fever	6	2	5
Diphtheria and croup	333	285	276	Poliomyelitis	5	4	3
Epidemic encephalitis	2	1	2	Puerperal fever	18	13	26
Erysipelas	299	245	261	Scabies	1,361	878	969
German measles	60	225	703	Scarlet fever	734	564	624
Gonorrhea	1,003	672	817	Syphilis	86	70	62
Influenza	8,476	7,204	11,259	Tetanus, neonatorum	3	1	5
Malaria	7	3	4	Typhoid fever	4	3	3
Measles	1,072	545	523	Undulant fever (Bact. abort. Bang)	44	32	54
Mumps	1,013	848	1,074	Whooping cough	3,691	2,980	3,057

FRANCE

Vital statistics—1935–1934—Comparative.—Following are vital statistics for France for the years 1935 and 1934:

	1935	1934		1935	1934
Number of marriages	284,604	298,192	Total deaths	658,357	694,525
Live births	638,881	677,365	Deaths per 10,000 population	157	161
Live births per 10,000 population	152	161	Deaths under 1 year of age	44,267	46,989
Stillbirths	24,055	25,722	Deaths under 1 year per 1,000 live births	69	69

JAMAICA

Communicable diseases—4 weeks ended May 16, 1936.—During the 4 weeks ended May 16, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox		9	Puerperal fever	1	1
Dysentery	9	8	Tuberculosis	56	86
Leprosy	2	2	Typhoid fever	16	51

YUGOSLAVIA

Communicable diseases—April 1936.—During the month of April 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	28	3	Paratyphoid fever	12	2
Cerebrospinal meningitis	18	6	Scarlet fever	369	8
Diphtheria and croup	499	47	Sepsis	14	4
Dysentery	15	1	Tetanus	36	12
Erysipelas	234	7	Typhoid fever	227	43
Influenza	87	2	Typhus fever	106	9
Measles	1,250	23			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for May 29, 1936, pages 718–730. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued June 26, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Brazil—Ceara State—Crato.—During the week ended April 4, 1936, 1 case of plague was reported at Crato, Ceara State, Brazil.

Smallpox

Mexico.—During the month of March, smallpox was reported in Mexico as follows: Aguascalientes, Aguascalientes State, 4 cases, 2 deaths; Chihuahua, Chihuahua State, 1 case, 1 death; Colima State, 1 case; Guanajuato State, 5 cases, 3 deaths; Guadalajara, Jalisco State, 70 cases, 43 deaths; Mexico State, 4 cases, 1 death; Mexico, D. F., 18 cases, 2 deaths; Morelos State, 1 case; Puebla, Puebla State, 2 cases, 1 death; San Luis Potosi, San Luis Potosi State, 8 cases, 2 deaths; Sonora State, 1 case; Tlaxcala State, 1 death; Quintana Roo, 1 case.

Typhus Fever

Bolivia.—During the month of April 1936, 75 cases of typhus fever were reported in Bolivia as follows: La Paz Department, 18 cases; Oruro Department, 5 cases; Potosi Department, 52 cases.

China—Shanghai.—During the week ended May 2, 1936, 1 case of typhus fever was reported at Shanghai, China.

Mexico.—During the month of March 1936, typhus fever was reported in Mexico as follows: Aguascalientes, Aguascalientes State, 5 cases, 1 death; Durango State, 1 case, 1 death; Guanajuato State, 56 cases, 18 deaths; Leon, 20 cases, 7 deaths; Mexico State, 15 cases, 1 death; Mexico, D. F., 52 cases, 22 deaths; Puebla, Puebla State, 3 cases; San Luis Potosi, San Luis Potosi State, 6 cases; Tlaxcala State, 1 case.

Yellow Fever

Bolivia—Santa Cruz Department.—During the month of April 1936, 1 case of yellow fever was reported in Santa Cruz Department, Bolivia.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

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Quarantinable and Other Diseases in Foreign Countries

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

Requests for and communications regarding the PUBLIC HEALTH REPORTS, reprints, or supplements should be addressed to the Surgeon General, United States Public Health Service, Washington, D. C. Subscribers should remit direct to the Superintendent of Documents, Washington, D. C.

Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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VOL. 51 JUNE 19, 1936 NO. 25

MARINE HOSPITALS AND BENEFICIARIES OF THE PUBLIC HEALTH SERVICE

By S. L. CHRISTIAN, *Assistant Surgeon General, United States Public Health Service*

THE MARINE HOSPITALS

Prior to 1798 there was no organized system of providing medical relief for American seamen, and such a need soon became apparent; for, as a result of travel to and from infected ports of the world, seamen frequently contracted strange maladies and upon arrival in other ports had no claims of citizenship on treatment facilities. Consequently they were a class apart, and there was need of special arrangements to prevent undue suffering. This need had been recognized by the mother country early in our colonial history. In 1692 Charles II began construction, in Greenwich, of the first building known to have been set apart by an English-speaking nation, and probably by any nation, exclusively as a hospital for seamen. Seamen of the American colonies were taxed to support this hospital. "Hospital money" was collected as early as 1729 in the amount of 6 pence per month from all British and colonial seamen sailing in and out of American ports.

The following letter to the Secretary of State from Evan Jones, Esq., dated New Orleans, August 10, 1801 (then under Spanish rule), is descriptive of the lack of treatment facilities for seamen in most parts of the world at the close of the eighteenth century:

A great number of American citizens, especially seamen and boatmen from the Ohio, die here yearly for want of a hospital, into which they might be put and taken care of, not that they are refused admittance into the Spanish Poor Hospital, but that building is by much too small for the purpose. No public house of any reputation will take them in, and consequently they lie in their ships or boats or get into wretched cabins, in which they die miserably, after frequently subjecting the humane among their countrymen to much trouble and expense. Would not this be an object, Sir, worthy of the attention of the Government of the United States? And might not a fund be easily established for the preservation of these poor people by imposing a light tax upon every vessel and boat that comes in, as well as upon every seaman and boatman?

About 200 vessels have entered here from sea during the 12 months past, and, allowing 8 men only to each, it makes 1,600 Perhaps 350 to 400 boats have come down from the Ohio, etc., during the same time, and, allowing four men to each, it would make about an equal number of men. A small sum from each, added to something from every vessel and boat would probably produce a capital equal to the exigency.

At the solicitation of the Boston Marine Society, several bills to provide medical relief for seamen were introduced early in the American Congress, and on July 16, 1798, the second President of the United States, John Adams, signed the act "for the relief of sick and disabled seamen" which established the United States Marine Hospital Service.

The first treatment furnished seamen by the Marine Hospital Service was given in Boston by Dr. Thomas Welch early in 1799. Dr. Welch assisted in caring for the wounded at the battles of Lexington and Concord, and during the Revolutionary War he was surgeon of the twenty-seventh Continental Regiment. He was appointed by President Adams as the first medical officer of the Marine Hospital Service and was in charge at Boston from 1798 to 1804.

The first marine hospital, located at Washington Point, Norfolk County, Va., was purchased from the State of Virginia in 1801; the deed transferring this property was signed by Gov. James Monroe on April 20th of that year. This old marine hospital was torn down in 1933, and there remains today nothing on the site to mark its former location. The second marine hospital was built on contract by the Marine Hospital Service at Boston in 1803 and occupied in 1804. A careful reader of the "Columbian Centinel" of October 30, 1802, would have noted the following announcement:

A MARINE HOSPITAL is to be erected by the United States in Charlestown, on the North Easterly part of the Land purchased to accommodate the Navy Yard * * *. In general, the Hospital is to be one hundred and fourteen feet long and thirty nine feet wide, to be built with brick, two stories high, and a well-stoned cellar under the whole. [Very complete details follow]. In order, therefore, to avoid any mistake or painful questions relative to this business, the plot of the building may be seen in the Collector's [Customs] office in Boston at all times * * *.

Dr. Charles Jarvis was the first physician in charge of the hospital, and upon his death in 1807, he was succeeded by Dr. Benjamin Waterhouse, an illustrious physician of his day, who introduced smallpox vaccination in this country. Dr. Waterhouse drew up the first set of rules and orders governing Marine Hospitals in April 1808. He was progressive and wished to make improvements in his station, as is evidenced by the following letter from Gen. Benjamin Lincoln, Collector of Customs, who had the "superintendence" of the hospital:

June 16, 1808: The physician of the hospital reports to me that he is in want of a building, I think about twenty feet square, two stories high, as a barn, in

which he can place his hay and straw, and a place in which he can stow away old bunks. Besides, he wants one small room wherein he can cleanse the people who are lousy, and who have the itch.

From 1798 to 1884 the Marine Hospital Service was supported in part by monthly contributions of money deducted from the wages of seamen. This deduction was at the rate of 20 cents per month per man from 1798 to 1870 and 40 cents per month from 1870 until 1884. From 1884 until 1905 the hospitals were supported in part by tonnage taxes. Since 1905 they have been supported entirely by annual appropriations made by Congress. At this point it is interesting to note that the United States Navy had no separate medical establishment prior to 1811, and sailors of the Navy contributed to the marine hospital fund in the same way as did the sailors from the merchant marine. Since 1906 the tonnage tax has been turned into the general income of the Government instead of being devoted to the specific purpose for which it was originally designed and used, but it still constitutes an important source of revenue, having yielded $14,920,618.35 between 1885 and 1906 and a larger amount, relatively, since that period, as shown by the accompanying table:

Fiscal year	Tonnage tax	Fiscal year	Tonnage tax
1907	$1,044,781.13	1922	$1,818,330.70
1908	1,076,571.69	1923	1,688,786.68
1909	1 052,374 37	1924	1,713,428.68
1910	1,081,526.70	1925	1,813,755.66
1911	1,083,255 34	1926	1,825,714.39
1912	1,156,010.75	1927	2.245,511.68
1913	1,273,789.43	1928	1,939,289.98
1914	1,310,759.03	1929	2,014,438.06
1915	1,315,425.30	1930	2,021 2 5.94
1916	1,454,565.83	1931	1,777,6 2.54
1917	1,393,743.16	1932	1,601,22[illegible].43
1918	1,171,418.36	1933	1,418,774.87
1919	1,265 229.23	1934	1,483,161.11
1920	1,707,034.44	1935	1,452,257.50
1921	2,191,895 85		

There still lingers in the minds of many, especially of old sailors, a belief that the Government possesses a large sum of marine hospital money; but between 1798 and 1884 the seamen's contributions amounted to $15,794,807.63, while the total expenditures made for hospital purposes amounted to $19,622,371.87; the difference was made up by Congressional appropriations.

The fathers of the Constitution, having little conception of public health aid as a fundamental responsibility of the Government, did not enumerate it specifically as one of the functions of the Federal Government, and so the Public Health Service had its origin in the Marine Hospital Service, the original and sole function of which, as indicated by its name, was to provide hospital service and medical treatment for sailors of the merchant marine (and until 1811 to sailors of the Navy), then one of the most important industries of the young

Nation. As time passed, the new country developed and medical science made truly remarkable discoveries in epidemiology, preventive medicine, and sanitation. It was quite natural that additional duties of a public health nature were gradually imposed upon the Marine Hospital Service, and in keeping with these new duties the words "Public Health Service" were added to its official name. For about 10 years, then, it was known as the "United States Public Health and Marine Hospital Service." In 1912 its name was again changed to one more suitable to its expanded character and the development of public health science, and it became the United States Public Health Service. However, this change in name was not made because it ceased to operate the marine hospitals, nor because that function decreased. On the contrary, the number of seamen patients

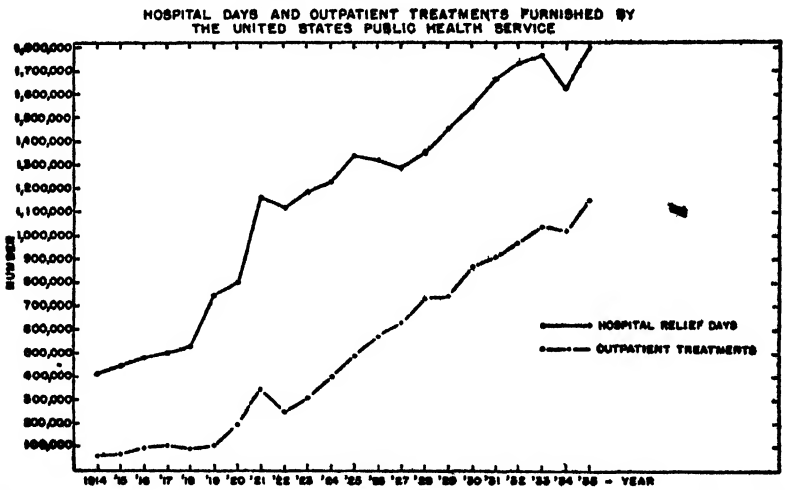
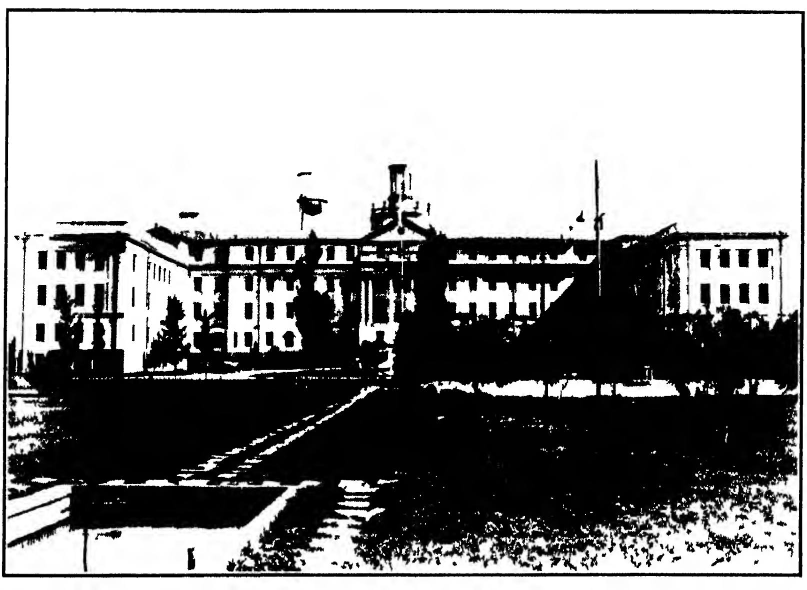


FIGURE 1.—Some of the increase in service shown in this chart is the result of increase in the number of beneficiaries in certain groups, such as merchant seamen, Coast Guard personnel, and Civil Service employees, and some is due to additional classes of beneficiaries authorized by Congress from time to time (For 3 years, 1919–22, before the Veterans' Bureau was organized in 1922, the Public Health Service bore the heavy emergency responsibility of providing hospital care and treatment for veterans of the World War These beneficiaries are not included in the figures represented by the graphs in the chart.)

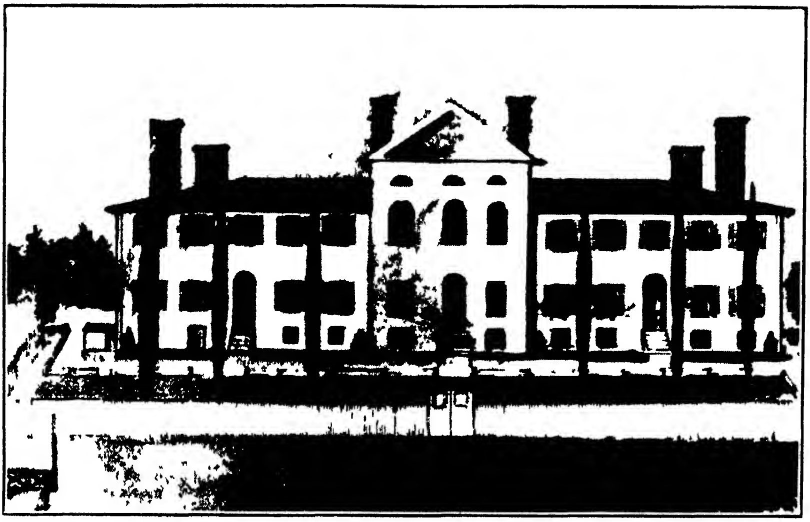
and the number of marine hospitals continued to increase, and from time to time Congress authorized the construction of additional marine hospitals and treatment in these hospitals of persons other than seamen.

At present there are 26 marine hospitals, including two specialized institutions—a leprosarium at Carville, La., and the tuberculosis sanatorium at Fort Stanton, N. Mex. The other marine hospitals are located in Baltimore, Md.; Boston, Mass.; Buffalo, N. Y.; Chicago, Ill.; Cleveland, Ohio; Detroit, Mich.; Ellis Island, N. Y.; Evansville, Ind.; Galveston, Tex.; Key West, Fla.; Louisville, Ky.; Memphis,

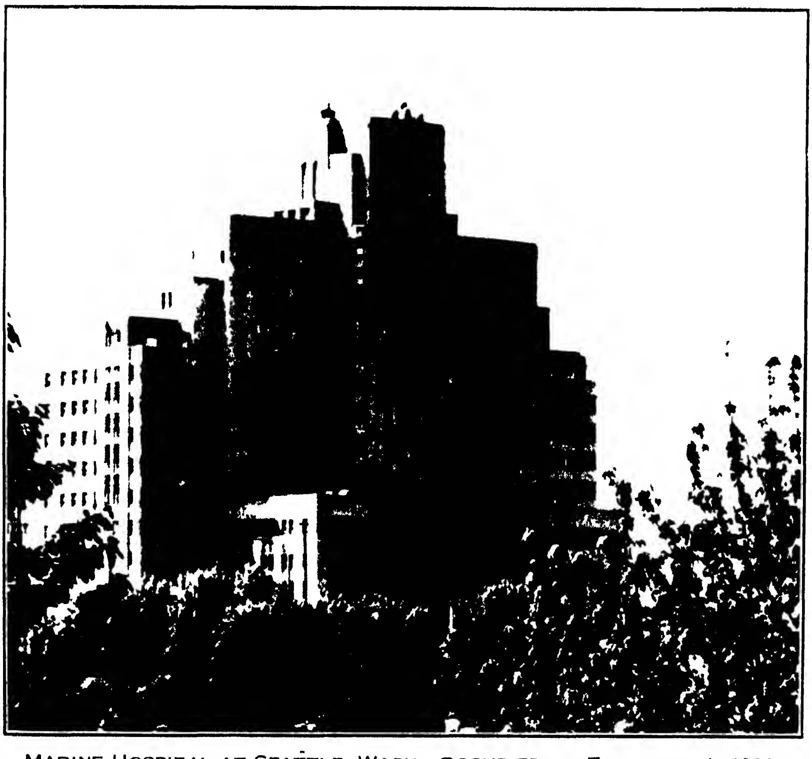
Old Marine Hospital at Norfolk Va the First Marine Hospital Owned by the Marine Hospital Service Purchased From the State of Virginia in 1801



New Marine Hospital at Norfolk Va, Occupied on February 15, 1934.



FIRST MARINE HOSPITAL BUILT BY THE MARINE HOSPITAL SERVICE AT BOSTON MASS COMPLETED IN 1803 AND OCCUPIED IN 1804



MARINE HOSPITAL AT SEATTLE, WASH , OCCUPIED ON FEBRUARY 1, 1933.

Tenn.; Mobile, Ala.; New Orleans, La.; New York City; Norfolk, Va.; Pittsburgh, Pa.; Portland, Maine; St. Louis, Mo.; San Francisco, Calif.; Savannah, Ga.; Seattle, Wash.; Stapleton, N. Y.; and Vineyard Haven, Mass.

These hospitals have a total of approximately 6,000 beds and 278 physicians, 59 dentists, 522 nurses, 146 technicians, and 268 consulting specialists, while 2,034 other persons are required to provide the modern scientific medical, surgical, dental, and nursing care to which marine hospital beneficiaries are entitled. In addition to these hospitals, the Public Health Service also operates 126 outpatient offices, or contract hospital facilities, in which 36 full-time and 110 part-time physicians and 51 full-time and part-time employees are on duty.

BENEFICIARIES OF THE PUBLIC HEALTH SERVICE

The medical relief beneficiaries of the Public Health Service are as follows:

1. Merchant seamen (act of July 16, 1798).

2. Officers and enlisted men, active and retired, of the United States Coast Guard (acts of Aug. 4, 1894, June 24, 1914, Mar. 3, 1919, and May 18, 1928).

3. Officers and seamen on vessels of the United States Coast and Geodetic Survey (act of Mar. 3, 1919).

4. Officers and crews of vessels, certain keepers and assistant keepers of the Lighthouse Service, active and retired (acts of Aug. 28, 1916, Mar. 3, 1919, and June 24, 1930).

5. Officers and crews of vessels of the Bureau of Fisheries (acts of July 1, 1918, and Mar. 3, 1919).

6. Seamen (not enlisted in U. S. Army) from vessels of the Army Engineer Corps, Army transports, and other vessels of the United States Army (act of Mar. 3, 1919).

7. Seamen on vessels of the Mississippi River Commission (act of Mar. 3, 1919).

8. Seamen (not entitled or commissioned in the Military or Naval Establishments) employed on vessels of the United States Government (other than those of the Panama Canal) of more than 5 tons' burden and on State school ships (act of Mar. 21, 1936).

9. Cadets on State school ships (act of Mar. 21, 1936).

10. Aliens detained in hospitals of the Public Health Service under the immigration laws and regulations (act of Dec. 26, 1920).

11. Beneficiaries of the Employees' Compensation Commission (acts of Sept. 7, 1916, Mar. 3, 1919, Feb. 15, 1934, and Apr. 8, 1935).

12. Lepers (act of Feb. 3, 1917).

13. Officers of the Public Health Service and those employees of the Public Health Service on field duty (acts of June 23, 1913, Sept. 7, 1916, Mar. 3, 1919, and Apr. 9, 1930).

14. Officers and employees of the Public Health Service at national quarantine stations, on board quarantine vessels, and at foreign ports (act of Mar. 3, 1931).

15. Persons eligible for treatment or confinement in a United States narcotic farm (act of Jan. 19, 1929).

16. Federal prisoners confined in public institutions under the control of the Department of Justice (act of May 13, 1930).

17. Pay patients:

   (1) Foreign seamen (acts of May 2, 1802, and Mar. 3, 1875).
   (2) Patients of the Veterans' Administration (act of Mar. 3, 1919).
   (3) Officers and enlisted men of the United States Army (Executive order of Apr. 3, 1917, and act of Mar. 3, 1919).
   (4) Officers and enlisted men of the United States Navy (act of Mar. 3, 1875, Executive order of Apr. 3, 1917, and act of Mar. 3, 1919).
   (5) Enrollees in the Civilian Conservation Corps (act of Mar. 31, 1933).

18. Patients with diseases affecting the public health, subject to special study (act of June 5, 1920).

Merchant seamen.—For the purposes of determining eligibility to treatment, the term "merchant seaman" is defined as "any person employed on board in the care, preservation, or navigation of any registered, licensed, or enrolled vessel of the United States or in the service, on board, of those engaged in such care, preservation, or navigation." Temporary medical relief only is contemplated, and seamen are entitled to treatment only during their service as seamen and for a brief period thereafter; but a seaman once under treatment may continue in the treatment status until he has received the maximum benefit to be expected from hospital or out-patient care. However, a seaman will not be admitted to hospital or out-patient care (except under special circumstances) when more than 60 days have elapsed since his last day of service on a vessel or if he has of his own volition discontinued his occupation as a seaman. Since American ships have always roamed the seven seas, practically every known disease is met with at some time or other in the wards of marine hospitals. Seamen constitute about 60 percent of all marine hospital patients; and adequate treatment of this class of patients, gathered from all parts of the world and afflicted with all the diseases of mankind, requires thoroughly trained and widely experienced physicians representing all the specialties of modern medicine and surgery. This work affords exceptional opportunities for young physicians to see tropical and other important diseases not commonly seen in continental United States.

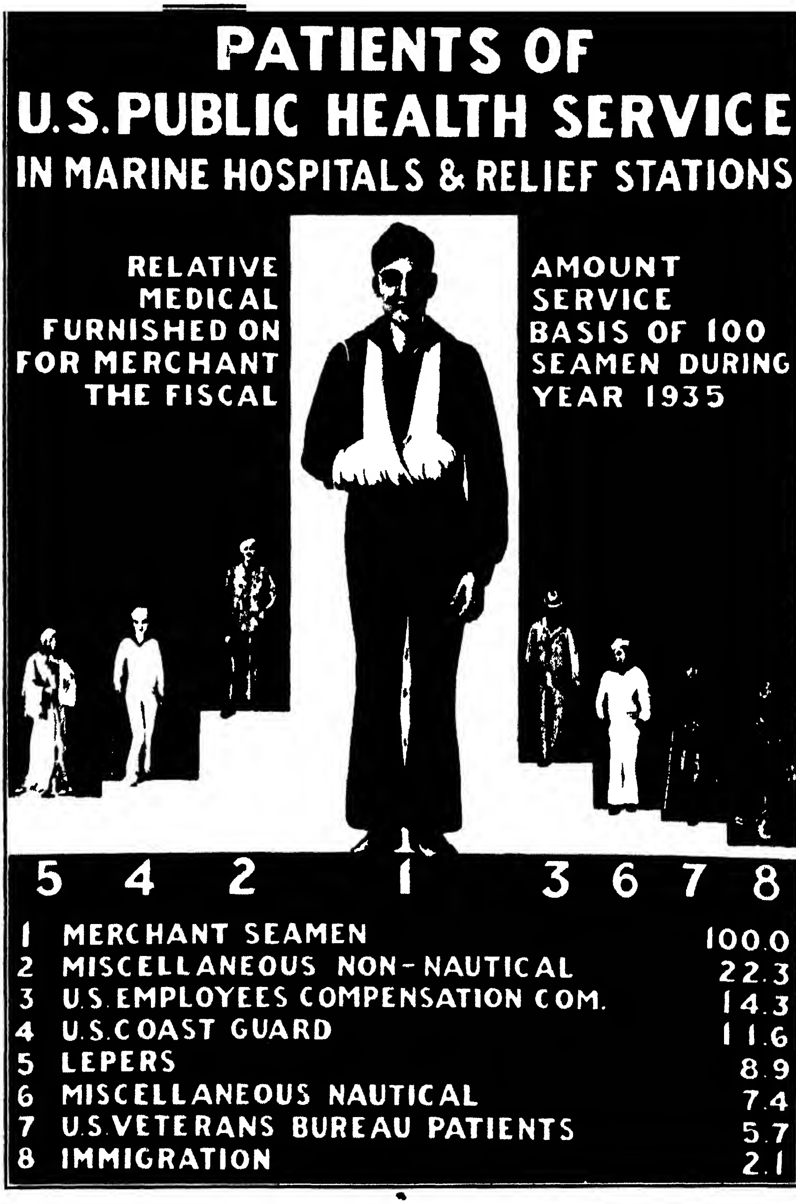


FIGURE 2.—Graphic representation of the relative amounts of medical service furnished different groups of beneficiaries

In the year ended June 30, 1935, 1,145,469 days of hospital relief and 593,554 out-patient treatments were furnished seamen by the Public Health Service.

United States Coast Guard.—The Public Health Service functions as the medical department for the Coast Guard. The primary duties of the Coast Guard are the prevention of smuggling and the saving of life at sea. To accomplish this the Coast Guard had, on June 30, 1935, an officer and enlisted personnel numbering about 11,000, stationed on seagoing cutters, patrol boats, airplanes, and at lifesaving stations along the coasts. The officers and crews of these important vessels and stations must be kept as hardy and healthy as possible. The responsibility of the Public Health Service in this connection begins with the entrance examination of candidates who seek admission to the Coast Guard and continues throughout the active and retired life of the Coast Guardsmen. For recruiting, promotion, and retirement purposes about 18,000 complete physical examinations are made annually for the Coast Guard and there are approximately 4,000 hospital admissions per year. In addition to the medical officers who serve the Coast Guard in hospitals, 20 medical officers and 5 dental officers are detailed to duty on board Coast Guard vessels and at shore stations, including the Coast Guard Academy.

Civil Employees of the United States Government.—Civil employees of the United States Government injured in the performance of duty and those contracting occupational diseases are entitled to all necessary medical relief in Government institutions when suitable facilities are available. In addition to the medical relief the Public Health Service affords beneficiaries of the United States Employees' Compensation Commission, this service also appoints officers, when requested by the commission, to act as medical advisers and referees for the commission.

Two important new groups of beneficiaries have recently been added to the beneficiaries of the commission in the personnel employed by the Civil Works Administration and the Works Progress Administration. Members of these groups are entitled to medical relief only when they suffer traumatic injuries incurred in performance of duty.

Coast and Geodetic Survey.—Officers and seamen serving on board the 30 vessels of this branch of the Federal Government are entitled to medical relief by the Public Health Service, with certain minor differences, in the same manner as are merchant seamen.

United States Lighthouse Service.—The personnel manning lighthouse vessels are entitled to marine hospital treatment under regulations similar to those affecting merchant seamen. The Public Health Service provides medical supplies to lighthouse vessels, a provision

not made to any other vessels except those of the Coast Guard. By special act of the Congress, certain lighthouse keepers who pass a prescribed physical examination upon entering that service are eligible to treatment by the Public Health Service.

Bureau of Fisheries.—The officers and crews of the 20 vessels of the Bureau of Fisheries are entitled to medical treatment under the same conditions as those applying to merchant seamen.

United States Immigration Service.—Immigration laws direct the mandatory exclusion of aliens from the United States for a number of specified conditions, among which are certain mental and physical conditions such as idiocy, imbecility, feeblemindedness, epilepsy, insanity, mental defectiveness, constitutional psychopathic inferiority, chronic alcoholism, and tuberculosis in any form. Exclusion is also mandatory for those afflicted with any of the following-named loathsome or dangerous contagious diseases: Favus; ringworm of the scalp, nails, or beard; actinomycosis; blastomycosis; mycetoma; leprosy; yaws; syphilis; gonorrhea; soft chancre; trachoma; amebiasis; leishmaniosis; trypanosomiasis; filariasis; schistosomiasis; paragonomiasis. As a reliable examination and past history are in most cases unavailable for the examining medical officer, the detection of these diseases is often an extremely difficult matter and requires the services of experienced physicians. This fact was recognized in the immigration laws, as is shown in the following extract from the law:

> That the physical and mental examination of all arriving aliens shall be made by medical officers of the U. S. Public Health Service who shall have had at least two years' experience in the practice of their profession since receiving the degree of doctor of medicine * * *.

As the correct diagnosis of such conditions is of paramount importance, the hospitals of the Public Health Service are used for diagnostic purposes and also for treatment of detained aliens. During late years much of the work of examining immigrants has been performed by officers of the Public Health Service detailed to serve as medical advisers to the American consuls in foreign ports. This has resulted in a great decrease in the number of arriving aliens who would otherwise make a trip to our country only to be detained and deported.

Civilian seamen, United States Army vessels.—The civilian officers and crews of the vessels of the United States Engineer Corps, Army Transport Service, and other vessels of the United States Army are entitled to treatment at marine hospitals and relief stations under the same conditions as are merchant seamen. In some of the marine hospitals located on the rivers, the crews of vessels of the Engineer Corps furnish from 25 to 35 percent of patients hospitalized. The civilian crews of Federal Government vessels are also entitled to the benefits provided by the United States Employees' Compensation Act, and those who are veterans are entitled to treatment under three

different classifications, namely, as veterans, as seamen, United States Engineer Corps, and as Federal employees under the United States Employees' Compensation Commission.

Other civilian seamen on United States Government vessels and cadets on State school ships.—Prior to March 21, 1936, there were a few seamen serving on Government-owned vessels who had never been included among the medical relief beneficiaries of the Public Health Service. These, together with the cadets acquiring nautical knowledge on State-owned school ships, were made beneficiaries by the act of March 21, 1936.

Seamen, vessels of the Mississippi River Commission.—Officers and men from the various vessels and other floating equipment of the Mississippi River Commission are entitled to treatment under the same regulations as apply to merchant seamen.

Lepers.—Notwithstanding the fact that leprosy is one of the most dreaded and dreadful of all diseases, and that its existence has been known and feared for many years and has attracted attention in the United States since the beginning of the last century, it was not until February 3, 1917, that the Federal Government made provision for the apprehension, detention, and treatment of those unfortunate persons afflicted with this disease. Although the act of Congress providing for the care of lepers was passed in 1917, owing to the reluctance of citizens to have lepers in their communities it was not until 1921 that the Public Health Service was able to secure a site for its leprosarium, and in that year the leper colony at Carville was purchased from the State of Louisiana.

The leper population of the colony is about 400. Any leper resident in the United States, except aliens subject to deportation, who presents himself, or who may be apprehended under the United States quarantine acts or duly consigned to the leprosarium by competent State health authorities, is received for detention and treatment under appropriate regulations. This hospital is serving a useful purpose in caring for these unfortunates who have been social outcasts from time immemorial. Patients at the leprosarium receive all the necessities of life and many of the comforts and luxuries. They receive the benefit of modern scientific treatment, which apparently arrests some cases, markedly improves many, and ameliorates the distress and pain of nearly all to a greater or lesser degree. There is always the hope that the opportunity to study the disease, afforded by a large number of cases in a modern hospital, may result in the discovery of a reliable cure.

Personnel of the Public Health Service.—Strange as it may seem, there was no legal provision for the Public Health Service to treat

its own personnel until 1913, when authority was granted for treatment for those officers and employees on full-time duty in the field.

The act of March 3, 1931, made officers and employees on duty at any national quarantine station or on a national quarantine vessel or detailed for duty in foreign ports under the quarantine act of 1893, full beneficiaries and entitled to all necessary medical treatment and other benefits authorized to be furnished to beneficiaries.

Narcotic-drug addicts.—A significant change in Federal policy toward the problem of drug addiction occurred in 1929, when Congress authorized two institutions for the segregation and confinement of prisoners addicted to the use of habit-forming narcotic drugs who have committed offenses against the United States and of addicts who voluntarily submit themselves for treatment. The objects, purposes, and designs of these institutions are to rehabilitate, restore to health, and train to be self-supporting and self-reliant those who are admitted.

Federal prisoners.—An act of the Seventy-first Congress, second session, approved by the President on May 13, 1930, authorized the Public Health Service to supervise and furnish the medical, psychiatric, and other technical and scientific services to the Federal penal and correctional institutions—a distinct departure from the former policy of having an individual medical organization for each prison.

Pay patients.—Foreign seamen—that is, seamen from foreign vessels—personnel of the United States Army and Navy, beneficiaries of the United States Veterans' Administration, and members of the Civilian Conservation Corps are treated in marine hospitals as pay patients at rates approved annually by the President of the United States.

Persons entitled to vaccination against smallpox and typhoid fever.—Federal employees engaged in interstate travel are, by departmental orders, entitled to these vaccinations.

Persons entitled to physical examination only.—More than 100,000 physical examinations are made each year by officers of the Public Health Service for other agencies of the Government which require special written examination reports on persons in whom they are interested in various ways. These examinations do not include the more numerous physical examinations relating to treatment of patients, although some beneficiaries who are entitled to treatment are included in the following classes:

Pilots, masters, mates, and engineers.—The Bureau of Navigation and Steamboat Inspection, Department of Commerce, requires all applicants for license to pass a satisfactory test for visual acuity, color vision, and physical fitness, which are important factors of safety in the navigation of ships. More than 6,000 applicants are

so examined annually, of whom between 3 and 4 percent are found to have defective color vision and, hence, are incapable of distinguishing the common color signals used at sea. An examination is also made of these applicants for proficiency in the principles of first aid to the sick and injured.

Able-bodied seamen.—The seamen's act of 1915 requires that 65 percent of all seamen manning an American vessel must approach a satisfactory health standard and be physically competent to perform certain emergency duties. Of 40,000 such seamen examined annually, a considerable number are rejected for defective vision and color vision, diseases of the heart, venereal diseases, and other physical defects.

Food handlers.—Physical examinations of food handlers are not so valuable as was formerly thought, principally for the reason that a person may become capable of transmitting infection shortly after he has passed a perfect physical examination and the person in question, as well as his supervisor, may be lulled into a false sense of security by reason of the recent findings of the examination; but as an aid in the enforcement of interstate quarantine laws, which require exclusion from employment on common carriers of food handlers who may be carriers of communicable disease, medical officers of the Public Health Service will examine cooks, waiters, and other food handlers upon request of the agents of common carriers engaged in interstate commerce, including vessels of the United States.

Civil service applicants for appointment and retirement.—The preliminary medical certificate which is sometimes, but not always, required by the Civil Service Commission when an applicant applies for civil service examination, is often furnished by the private physician of the applicant. Upon being placed on the civil service list of eligibles and selected for a position, an applicant is required, before entering on his duties, to pass a physical examination which is made by a medical officer of the Federal service. The Public Health Service performs approximately 22,000 of these examinations each year, including those made in connection with the administration of the Civil Service Retirement Act.

The advantages of a physical-examination report made by a Public Health Service officer before an employee enters on governmental duty are obvious. A confidential record is made of conditions that might later cause disability, and these records are useful not only in the matter of placement of the employee with due regard for his physical strength but in settling claims for compensation that may subsequently be made to the Employees' Compensation Commission.

Civil service employees suspected of having a communicable disease.—

industrial application. This investigation was undertaken at the request of Stanco, Inc., and was conducted jointly by the United States Bureau of Mines and that company at the Pittsburgh Experiment Station of the Bureau of Mines.

SCOPE OF WORK

The work included a study of the toxicity and physiological response of guinea pigs exposed to vapors of secondary amyl acetate. Only acute effects as produced by a single exposure were studied. The experiments were planned to cover a range of concentrations and periods of exposure which produce but slight or no response, moderate response, and serious response.

CHEMICAL AND PHYSICAL PROPERTIES

The secondary amyl acetate ($(CH_3CH_2CH_2)$ CH_3. CHO. $COCH_3$) used in this study was a commercial grade sold for industrial use. It was a light, clear amber in color and had a pleasant ethereal odor in very dilute concentrations, but in the concentrations studied the odor was pungent, nauseating, and disagreeable. A determination of the specific gravity and boiling range of the material gave the following results:

Specific gravity

15.6°/15.6°C	0.8686
20°/15.6°C	0.8645

Boiling range

Distillate, cumulative (percent)	Temp. °C., corrected to 760 mm	Distillate, cumulative (percent)	Temp. °C., corrected to 760 mm
Initial boiling point	125.0	50	133.6
1	126.5	60	134.0
2	127.5	70	134.5
3	129.0	80	135.0
4	129.4	90	136.1
5	129.8	95	137.5
10	131.3	97	139.1
15	131.7	98	140.9
20	132.0	99	143.1
30	132.7	99.5	146.2
40	133.1	99.9	149.2

Recovery 99.9 percent; residue 0.1 percent.

These values agree closely with the specifications furnished by the manufacturer, who also specified that the color of the material was 30+ (Saybolt), free acid 0.006 percent, and that it was prepared from methyl propyl alcohol.

One group of guinea pigs was exposed to a more refined sample of secondary amyl acetate which had a boiling range of 132° to 134.5° C.

The boiling point of the secondary amyl acetate as given in Beilstein (*2*) is 133.5° C.

Secondary amyl acetate is an organic solvent used widely in the preparation of lacquers. It was not used commercially until about 1930, when it was made available at a reasonable cost. This amyl acetate should not be confused with n-amyl acetate or iso-amyl acetate, which have been in use for many years.

TEST APPARATUS

The apparatus used for preparing secondary amyl acetate vapor-air mixtures and for exposing animals was the same as that described in a previous report dealing with butanone (*1*).

COMPUTATION AND ANALYSIS OF VAPOR-AIR MIXTURES

The method of computation of vapor-air mixtures from the amount of the liquid volatilized in a known quantity of air was the same as that described in the report on butanone (*1*). For direct chemical determination a sample of the chamber air was taken by partly evacuating a bottle (4 to 20 liters, depending on vapor concentration) and replacing the partial vacuum with the air to be examined. The volume of the vapor-air mixture was computed from the volume of the bottle and the differential manometer readings. From 10 to 50 cc of 95 percent alcohol was admitted to the bottle, the bottle was shaken to facilitate absorption of the secondary amyl acetate, and the solution was washed into an Erlenmeyer flask with additional alcohol. A measured volume of at least 50 percent excess standardized N/10 sodium hydroxide was added and the solution was refluxed one-half hour to hydrolyze the acetate. The excess sodium hydroxide was titrated with N/10 sulphuric acid, using phenolphthalein as an indicator. Table 1 gives the results of analysis of a standard solution of secondary amyl acetate in alcohol.

TABLE 1.—*Results of analysis of portions of a standard alcoholic solution of commercial secondary amyl acetate and a refined sample*

Secondary amyl acetate taken, milligrams	Secondary amyl acetate found, milligrams	Recovery, percent
	Commercial	
100	86.7	86.7 (Average 87.0.)
200	173.2	86.6
200	172.0	86.0
300	264.0	88.0
300	263.5	87.8
	Refined	
100	89.2	89.2 (Average 90.0.)
100	89.8	89.8
200	182.5	91.2
200	178.4	89.2
500	454.0	90.8

The average recovery for the commercial sample was 87 percent and for the refined sample 90 percent. The values obtained for the amount of secondary amyl acetate in the vapor-air mixtures used in the animal exposures (table 2) were corrected by multiplying the determined value for the commercial product by 100/87, or 115, and the refined by 100/90, or 111.

Table 2 gives the values for the concentrations as computed from the volume of air and amount of secondary amyl acetate vaporized, and the concentrations found by chemical analysis of vapor-air mixtures used in animal experiments. The calculation of the percent by volume was made on the basis that one gram molecular weight of secondary amyl acetate is equivalent to 22.4 liters of vapor at 0° C. and 760 mm mercury pressure.

TABLE 2.—*Results of analysis of atmospheres used for exposing animals* [a]

Concentration by—		Concentration by—	
Computation	Analysis	Computation	Analysis
([b])	0 95	([c])	0.91
([b])	94	([c])	.91
([b])	1 00	0.49	.48
([b])	1 01	0 49	.51
([b])	1.00	0 48	.51
([b])	1 05	0 50	.49
([b])	[d] 1.07	0 22	.20
([c])	94	0 22	.20
([c])	.93	0.22	.21

[a] Concentration in percent by volume at 25° C. and 760 mm pressure. To convert to mg per liter, multiply by 53 2.
[b] Concentration obtained by recirculating air in a closed chamber at 30° C and 740 mm pressure across wicks wet with commercial secondary amyl acetate. No computed concentration.
[c] Same as (b) except refined secondary amyl acetate
[d] Obtained by adsorption on air-equilibrated charcoal.

The maximum concentration attainable by recirculating air at 30° C. and 740 mm pressure over large surface wicks wet with commercial secondary amyl acetate in a closed chamber averaged approximately 1.0 percent. Under similar conditions, but with a temperature of 25° C., the refined product gave a concentration of 0.92 percent. This was the only concentration of refined secondary amyl acetate studied. The remainder of the results in table 2 represent experimental atmospheres prepared by continuously volatilizing a measured amount of the commercial secondary amyl acetate in a measured volume of air sufficient to give two to three air changes per hour in the experimental chamber. Tests have shown that this rate of change in the apparatus used is ample to prevent oxygen deficiency or significant increase in carbon dioxide. The general order of concentrations used in the experiments was 1.0, 0.50, and 0.20 percent by volume.

TEST PROCEDURE; DESCRIPTION AND CARE OF ANIMALS

The test procedure and description and care of animals were the same as described in the report on butanone (*1*).

RESULTS OF TESTS

This report presents summarized results pertinent to signs or objective symptoms, fatality, and gross pathology.

OBJECTIVE SYMPTOMS

Control animals.—No signs or symptoms were exhibited by the 18 control guinea pigs taken at random from the stock animals used in these experiments. No deaths occurred.

Exposed animals.—The signs or symptoms exhibited by animals exposed to secondary amyl acetate vapor in the order of their occurrence were as follows: Irritation of the nose and eyes, manifested by rubbing nose with forepaws and squinting; lacrimation; incoordination; narcosis; slow, shallow respiration; and death. Table 3 gives the average time necessary to produce the symptoms by various concentrations of secondary amyl acetate vapor in air. The figures given indicate the average time for the occurrence of the sign or symptom, excepting those in parentheses, which indicate that the particular sign or symptom did not occur in the maximum period of exposure as given.

TABLE 3.—*Signs and symptoms produced in guinea pigs exposed to vapors of secondary amyl acetate*

Type of symptom	Concentration of vapor in percent by volume			
	1.0	0.92 [a]	0.50	0.20
	Duration of exposure, minutes			
Nasal irritation (rubbing nose)	([b])	([b])	1	1
Eye irritation (squinting)	([b])	([b])	1	1-30
Lacrimation	1	1	5	[c] (810)
Incoordination	4	6	90	[c] (810)
Narcosis (unconsciousness)	20	20	300-540	[c] (810)
Slow, shallow, nearly imperceptible respiration	165	180	720	[c] (810)
Death	300	435	[c] (810)	[c] (810)

[a] Refined secondary amyl acetate; all other concentrations were prepared with commercial secondary amyl acetate.
[b] Occurred almost immediately after start of exposure
[c] Not observed in the maximum exposure time given in parentheses.

With the exception of nasal and eye irritation, no abnormal signs were observed during or following an exposure to 0.2 percent secondary amyl acetate vapor in air by volume for 810 minutes. With exposure to 0.5 percent in air, signs of irritation of the nose and eyes

occurred in 1 minute, lacrimation in 5 minutes, incoordination in 90 minutes, narcosis in 300–540 minutes, but no deaths occurred during or following an exposure of 810 minutes. The time for the occurrence of these symptoms decreased rapidly with increases in concentration, and death was produced by an exposure to 1.0 percent vapor in air for 300 minutes; a concentration of 0.92 percent of the refined secondary amyl acetate caused death in 435 minutes.

GROSS PATHOLOGY

Control animals.—The 18 control animals killed for autopsy exhibited no significant gross pathology.

Exposed animals.—The gross pathological findings in animals that died during exposure (see fig. 1 and table 3) were slight congestion

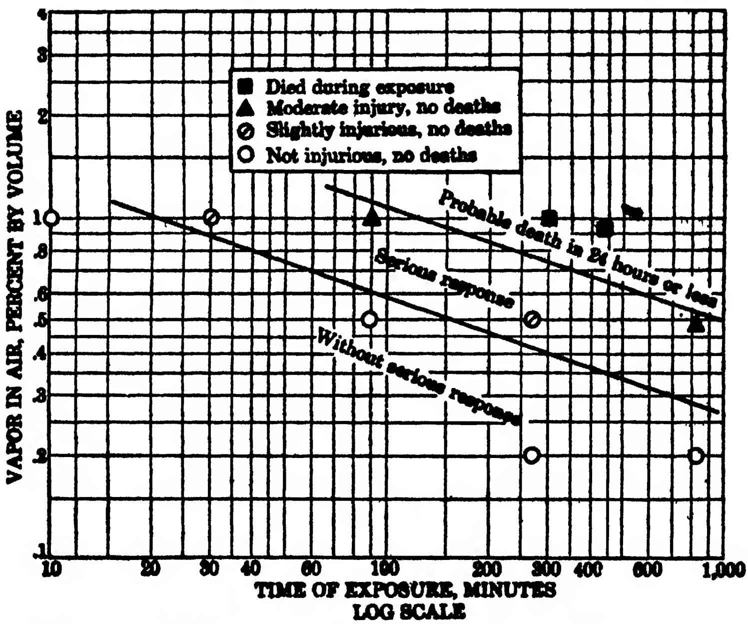


FIGURE 1.—Acute effect of exposure of guinea pigs to secondary amyl acetate vapor in air.

of the brain and moderate to marked congestion of the systemic organs. The lungs were moderately congested and emphysematous. Exposure to conditions which caused marked incoordination and narcosis (1.0 and 0.92 percent for 30 minutes) produced slight congestion of the brain, lungs, liver, and kidneys in animals killed immediately after exposure; but these findings were absent in animals killed for autopsy 4 to 8 days following exposure. Exposure to 0.5 percent for 810 minutes produced slight congestion of the lungs. No gross pathology was observed in animals exposed to 0.2 percent for 810 minutes.

SUMMARY OF FATALITY AND PHYSIOLOGICAL RESPONSE

The fatality and summary of the response of guinea pigs exposed to secondary amyl acetate vapor in air are shown graphically in figure 1 and given in conventional degrees of response in table 4. The results of each experiment are designated by a symbol which represents one of four different degrees of severity. The symbols represent the most severe response for a majority or at least 3 of a group of 6 animals exposed to a given condition. The response of none of the animals deviated markedly from that which is representative of the group.

The four degrees of response are given in the legend on figure 1. In addition to representing the response of each group by symbols, the symbols have been separated into three general fields or zones of probable response.

Table 4 gives the concentrations (obtained by direct experiment or extrapolated from table 3 and figure 1), which produce the degrees of response generally reported in the literature dealing with noxious gases. These data may be compared with toxicological data for other compounds (*1, 3, 4, 5, 6, 7, 8, 9*).

TABLE 4.—*Acute effects of exposure of guinea pigs to secondary amyl acetate vapor in air*

Acute effects of exposure after various periods of time	Concentration, percent by volume in air
Kills in a few minutes	([a])
Dangerous to life in 30 to 60 minutes	([a])
Dangerous to life after several hours	0.5–1.0
Maximum amount for 60 minutes without serious disturbance	0.5
Maximum amount for several hours with but slight or no symptoms	0.2

[a] Not produced by 1 percent, the highest concentration obtained in a closed chamber by extended recirculation of air (30° C. and 740 mm pressure) over wicks wet with secondary amyl acetate.

CAUSE OF DEATH

Death apparently was due to a state of narcosis which terminated in death rather than to the irritation of the lungs. No animals died following exposure; they either died during exposure or survived the exposure and the 4- or 8-day post-exposure observation period. In some instances the animals were unconscious several hours after termination of exposure (1.0 percent for 90 minutes and 0.5 percent for 810 minutes), but appeared normal 24 hours after exposure.

WARNING PROPERTIES AND HAZARDS OF ACUTE POISONING

Men exposed to 0.5 and 1.0 percent vapor in air even for a short time pronounced the atmosphere extremely disagreeable because of strong odor and irritation to eyes and nasal passages, and even 0.2 per-

cent was very unpleasant. This latter concentration produced no marked symptoms and was apparently harmless to guinea pigs after one exposure of several hours.

WARNING PROPERTIES AND EXPLOSION HAZARDS

The explosion hazard of secondary amyl acetate is minimized by the distinct warning properties of concentrations below the inflammable range but cannot be ignored. A few determinations of the inflammable properties of the vapor of the secondary amyl acetate used in this study indicated the lower limit to be approximately 1.2 percent, and the flash point to be approximately 26.5° C.

SUMMARY AND CONCLUSIONS

The acute physiological response of guinea pigs to air containing a commercial grade of secondary amyl acetate $((CH_3CH_2CH_2)\ CH_2.$-$CHO.COCH_3)$ vapor was determined. A refined grade was also used in one experiment. The concentrations of the vapor ranged from those that produced death to those that produced no effect after several hours' exposure. The signs of response, the fatality, and the gross pathology are given, and the warning properties as observed by the exposure of persons are described.

1. Secondary amyl acetate produces narcosis, terminating in death in the higher concentrations. The symptoms are principally those of eye and nasal irritation and narcosis. Animals that did not die during exposure recovered.

2. The principal gross pathological findings were congestion of the brain, lungs, liver, and kidneys, as observed in the autopsies performed immediately after exposure.

3. At room temperature it was not possible to attain a concentration that was dangerous to the life of guinea pigs in 30 to 60 minutes. Exposure to 0.5 to 1.0 percent vapor is considered dangerous to the life of guinea pigs after several hours; 0.5 percent the maximum amount for 1 hour without serious disturbance other than eye and nasal irritation; and 0.2 percent is the maximum amount for several hours with slight or no symptoms.

4. Commercial secondary amyl acetate used in the experiments had a distinct odor and was markedly irritating to the nose and eyes of men in concentrations found to be apparently harmless to guinea pigs after several hours' exposure. Concentrations of the vapor well below the estimated lower inflammable limit were extremely disagreeable to men from the standpoint of odor and eye and nasal irritation.

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(8) Smyth, H. F., and Smyth, H. F., Jr.: Inhalation experiments with certain lacquer solvents. Jour. Ind. Hyg., vol. 10, p. 163 (1928).

(9) Flury, F., and Wirth, W.: The toxicity of organic solvents (various esters, acetone, and methanol). Arch. Gewerbepath. Gewerbehyg., vol. 5, pp. 1–90 (1933).

LEGISLATION ENABLING INTERSTATE WATER COMPACTS

On June 8, 1936, the President approved Public Resolution No. 104 enabling the States named therein to conserve and regulate the flow of and purify the waters of rivers and streams whose drainage basins lie within two or more of the States. Congressional consent is a constitutional requirement for validity of interstate compacts. This resolution does not prescribe the legal process of consummating the compacts, but indicates a favorable attitude on the part of the Congress. Following is the text of the resolution:

[PUBLIC RESOLUTION—No. 104—74TH CONGRESS]

[H. J. Res. 377]

JOINT RESOLUTION

To enable the States of Maine, New Hampshire, New York, Vermont, Massachusetts, Rhode Island, Connecticut, Pennsylvania, West Virginia, Kentucky, Indiana, Illinois, Tennessee, and Ohio to conserve and regulate the flow of and purify the waters of rivers and streams whose drainage basins lie within two or more of the said States.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of the Congress of the United States is hereby given to the States of Maine, New York, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Pennsylvania, West Virginia, Kentucky, Indiana, Illinois, Tennessee, and Ohio, or any two or more of them, to negotiate and enter into agreements or compacts for conserving and regulating the flow, lessening flood damage, removing sources of pollution of the waters thereof, or making other public improvements on any rivers or streams whose drainage basins lie within any two or more of the said States.

SEC. 2. No such compact or agreement shall be binding or obligatory upon any State a party thereto unless and until it has been approved by the legislatures of each of the States whose assent is contemplated by the terms of the compact or agreement and by the Congress.

Approved, June 8, 1936.

DEATHS DURING WEEK ENDED MAY 30, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended May 30, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,792	8,246
Deaths per 1,000 population, annual basis	10.9	11.5
Deaths under 1 year of age	524	595
Deaths under 1 year of age per 1,000 estimated live births	47	54
Deaths per 1,000 population, annual basis, first 22 weeks of year	12.3	12.4
Data from industrial insurance companies:		
Policies in force	68,309,902	67,801,363
Number of death claims	13,560	10,469
Death claims per 1,000 policies in force, annual rate	10.4	8.1
Death claims per 1,000 policies, first 22 weeks of year, annual rate	10.8	10.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 6, 1936, and June 8, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 6, 1936, and June 8, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935
New England States:								
Maine	1	1			699	157	0	0
New Hampshire					30		0	1
Vermont					274	25	0	0
Massachusetts	7	5			1,302	451	8	0
Rhode Island	1	1			63	601	0	2
Connecticut	2	5	3	3	218	761	3	1
Middle Atlantic States:								
New York	38	35	[1] 3	[1] 6	2,746	3,478	8	29
New Jersey	16	14	9	8	605	2,454	3	4
Pennsylvania	48	43			919	2,481	10	2
East North Central States:								
Ohio	19	18	5	7	610	1,414	9	7
Indiana	11	11	16	6	9	155	2	8
Illinois [2]	51	46	57	20	82	1,412	8	19
Michigan	13	8		1	43	2,888	2	0
Wisconsin	8	1	10	22	241	1,953	0	1
West North Central States:								
Minnesota	2	4			811	351	1	1
Iowa		4		2	8	220	1	2
Missouri	24	26	26	10	21	167	6	10
North Dakota		1		1	7	11	1	0
South Dakota	4	2		1	8	31	0	0
Nebraska	7	4			19	183	0	1
Kansas	8	4	1	1	10	380	1	1
South Atlantic States:								
Delaware		2			23	26	0	0
Maryland [3]	4	6		4	322	96	5	10
District of Columbia	10	7			100	34	2	10
Virginia [3]	8	6	38		72	357	13	18
West Virginia	14	11	18	23	46	186	6	1
North Carolina	8	9	2	1	70	50	6	1
South Carolina	4	10	63	67	24	13	2	0
Georgia [4]	9	8					4	0
Florida		3	2		14	19	3	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 6, 1936, and June 8, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935
East South Central States:								
Kentucky	5	3	12	2		147	9	1
Tennessee	9	7	18	46	15	27	2	5
Alabama	7	5	15	15	6	80	3	4
Mississippi [3]	6	9					0	0
West South Central States:								
Arkansas	1	6	7	21	3	36	0	0
Louisiana	14	9	4	2	13	36	3	1
Oklahoma [5]	1	11	43	51	15	63	3	6
Texas	26	28	83	96	241	85	1	1
Mountain States:								
Montana [2]	1	2	2	15	2	324	1	1
Idaho [2]				1	11	3	0	0
Wyoming [2]	1				4	18	1	0
Colorado [2]	4	8			81	330	1	0
New Mexico	7	5	6	2	47	8	2	0
Arizona		6	22	6	86	18	6	0
Utah [2]		1	6		50	3	0	0
Pacific States:								
Washington			3		209	347	0	0
Oregon [2]		1	10	19	97	114	0	4
California	37	23	538	31	1,603	1,451	3	4
Total	431	414	1,022	492	11,424	23,449	133	161
First 23 weeks of year	12,123	14,824	137,542	101,131	229,681	621,885	5,158	3,295

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935
New England States:								
Maine	0	0	8	16	0	0	3	2
New Hampshire	0	3	11	9	0	0	0	0
Vermont	0	0	5	1	0	0	0	0
Massachusetts	4	0	235	197	0	0	2	2
Rhode Island	0	0	21	8	0	0	0	1
Connecticut	0	0	42	64	0	0	1	2
Middle Atlantic States:								
New York	3	3	655	903	0	0	2	11
New Jersey	0	2	248	165	0	0	3	5
Pennsylvania	2	2	495	573	0	0	7	11
East North Central States:								
Ohio	1	1	186	406	0	0	10	8
Indiana	0	1	73	55	7	1	6	3
Illinois [2]	5	1	453	994	12	5	6	9
Michigan	1	6	205	212	0	0	0	7
Wisconsin	1	0	301	435	16	14	0	3
West North Central States:								
Minnesota	0	1	231	214	6	8	0	8
Iowa	0	0	121	86	15	2	0	0
Missouri	0	1	104	45	3	1	2	7
North Dakota	0	0	38	46	6	6	1	0
South Dakota	0	0	41	12	8	3	0	0
Nebraska	0	0	47	44	27	42	0	3
Kansas	1	1	155	45	20	31	2	2
South Atlantic States:								
Delaware	0	0	1	7	0	0	0	1
Maryland [2]	0	1	40	66	0	0	2	1
District of Columbia	0	0	12	23	0	0	0	0
Virginia [2]	0	1	36	28	0	0	6	12
West Virginia	0	1	31	36	0	0	4	9
North Carolina	1	17	30	9	0	2	5	11
South Carolina	0	0	3		0	0	5	24
Georgia [4]	0	0	17	5	3	0	11	23
Florida	0	1	4	5	0	0	4	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 6, 1936, and June 8, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935	Week ended June 6, 1936	Week ended June 8, 1935
East South Central States:								
Kentucky	0	0	21	24	0	0	8	10
Tennessee	0	0	17	18	0	0	6	14
Alabama	0	1	2	5	0	1	5	16
Mississippi [3]	0	0	8	6	1	1	7	8
West South Central States:								
Arkansas	0	1	2		0	0	1	3
Louisiana	0	2	8	4	0	0	16	12
Oklahoma [5]	0	0	0	7	1	2	2	3
Texas	1	8	31	50	1	11	6	34
Mountain States:								
Montana [2]	0	0	59	11	8	1	3	0
Idaho [2]	0	0	11	2	3	1	0	0
Wyoming [2]	0	0	39	24	7	16	0	0
Colorado [2]	2	0	73	134	1	4	0	1
New Mexico	1	0	50	15	0	0	10	4
Arizona	0	0	14	18	0	0	1	2
Utah [3]	0	0	26	126	19	0	0	0
Pacific States:								
Washington	0	0	54	44	4	36	1	1
Oregon [2]	0	0	30	22	0	3	10	1
California	3	9	296	164	8	28	14	7
Total	26	53	4,514	5,385	171	215	172	284
First 23 weeks of year	428	618	164,730	160,582	5,203	4,383	2,754	3,392

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended June 6, 1936, 20 cases, as follows: Illinois, 1; Virginia, 1; Montana, 2; Idaho, 4; Wyoming, 7; Colorado, 2; Oregon, 3.
[3] Week ended earlier than Saturday.
[4] Typhus fever, week ended June 6, 1936, Georgia, 10.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April 1936										
Hawaii Territory	1	9	125		12		([1])		0	1
May 1936										
Arkansas	1	27	514	252	18	38	1	23	0	9
Connecticut	10	11	5		956		0	138	0	6
Delaware		1			60		0	15	0	
District of Columbia	13	98	5		709		0	82	0	1
Iowa	8	17	36	1	25		1	674	169	12
North Carolina	28	56	53		170	141	6	69	2	18

[1] A report of 36 cases of poliomyelitis under treatment at a crippled children's hospital, not previously reported, includes cases occurring through the period since August 1930.

April 1936

	Cases
Hawaii Territory:	
Anthrax	2
Chicken pox	63
Dysentery (amoebic)	3
Epidemic encephalitis	1
Leprosy	6
Mumps	6
Whooping cough	25

May 1936

	Cases
Chicken pox:	
Arkansas	94
Connecticut	371
Delaware	34
District of Columbia	32
Iowa	235
North Carolina	316
Conjunctivitis, infectious:	
Connecticut	19
Favus:	
Connecticut	6

May 1936—Continued

	Cases
German measles:	
Connecticut	1,888
Delaware	16
Iowa	26
North Carolina	651
Mumps:	
Arkansas	202
Connecticut	351
Delaware	53
Iowa	402
Ophthalmia neonatorum:	
Arkansas	1
North Carolina	2
Paratyphoid fever:	
Connecticut	3
North Carolina	2
Rocky Mountain spotted fever:	
District of Columbia	2
Septic sore throat:	
Connecticut	9
North Carolina	7

May 1936—Continued

	Cases
Tetanus:	
Delaware	1
Trachoma:	
Arkansas	1
Typhus fever:	
Connecticut	1
North Carolina	1
Undulant fever:	
Arkansas	1
Connecticut	6
Iowa	9
North Carolina	3
Whooping cough:	
Arkansas	48
Connecticut	483
Delaware	35
District of Columbia	136
Iowa	34
North Carolina	94

WEEKLY REPORTS FROM CITIES

City reports for week ended May 30, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	204	3	2	0	0	0	5	22
New Hampshire:											
Concord	0	------	0	0	1	1	0	0	0	0	13
Manchester	0	------	0	0	1	0	0	0	0	0	11
Nashua	0	------	------	32	------	1	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	24	0	0	0	0	0	0	8
Rutland	0	------	0	16	0	0	0	1	0	0	9
Massachusetts:											
Boston	3	------	0	313	17	50	0	10	2	32	204
Fall River	1	------	0	4	1	5	0	2	1	0	31
Springfield	0	------	0	1	0	6	0	0	0	2	28
Worcester	0	------	0	117	1	4	0	2	0	1	45
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	15
Providence	1	------	1	13	4	1	0	6	0	1	68
Connecticut:											
Bridgeport	0	------	1	2	1	3	0	2	0	1	17
Hartford	0	------	0	0	2	3	0	0	1	3	31
New Haven	0	------	0	2	1	0	0	0	1	15	46
New York:											
Buffalo	1	------	4	44	11	32	0	3	0	1	151
New York	41	12	2	1,398	94	274	0	102	1	70	1,390
Rochester	0	------	0	1	1	2	0	4	0	0	73
Syracuse	0	------	2	54	1	13	0	1	0	14	36
New Jersey:											
Camden	4	------	0	7	1	5	0	2	0	2	26
Newark	0	1	0	16	6	46	0	7	0	16	92
Trenton	0	------	0	1	1	2	0	1	0	7	32
Pennsylvania:											
Philadelphia	4	2	2	526	22	64	0	25	0	73	461
Pittsburgh	4	1	1	8	12	104	0	7	0	30	130
Reading	0	------	0	11	0	3	0	1	0	1	26
Scranton	0	------	------	0	------	4	0	------	0	0	------
Ohio:											
Cincinnati	5	------	0	21	1	17	0	10	0	3	109
Cleveland	1	2	0	106	9	46	0	14	0	126	179
Columbus	0	------	0	2	3	4	0	3	0	0	83
Toledo	0	1	0	16	6	3	0	5	1	22	73

City reports for week ended May 30, 1936

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Indiana:											
Anderson	0	------	0	0	0	5		0	0	5	8
Fort Wayne	1	------	1	0	2	7	0	1	0	0	25
Indianapolis	1	------	0	0	11	25	0	0	0	11	94
Muncie	0	------	0	1	2	0	0	0	0	0	9
South Bend	0	------	0	0	0	1	0	0	0	8	10
Terre Haute	1	------	0	0	0	1	0	0	0	0	28
Illinois:											
Alton	0	------	0	1	0	4	0	1	1	2	2
Chicago	24	3	2	10	39	187	0	39	3	60	611
Elgin	0	------	0	0	2	0	0	0	0	2	12
Moline	0	------	0	0	0	8	0	0	0	3	3
Springfield	0	------	0	0	0	7	0	0	0	1	27
Michigan:											
Detroit	3	------	0	17	28	173	0	12	0	272	260
Flint	0	------	0	1	5	9	0	3	0	2	32
Grand Rapids	0	------	0	4	1	14	0	1	0	5	27
Wisconsin:											
Kenosha	0	------	0	0	0	3	0	0	0	1	7
Madison	0	------	0	5	2	14	0	1	0	6	12
Milwaukee	0	1	1	31	4	65	0	8	0	88	89
Racine	0	------	0	2	0	8	0	0	0	2	--------
Superior	0	------	0	0	1	14	0	0	0	0	9
Minnesota:											
Duluth	0	------	0	7	2	11	0	1	0	7	22
Minneapolis	5	------	0	208	1	71	0	6	0	15	85
St. Paul	0	1	1	159	7	17	0	1	0	5	--------
Iowa:											
Cedar Rapids	0	------	--------	0	-------	2	0	-------	0	5	--------
Davenport	0	------	--------	0	-------	4	0	-------	0	0	--------
Des Moines	0	------	0	0	0	5	4	0	0	0	42
Sioux City	0	------	------	0	-------	14	12	-------	0	0	--------
Waterloo	0	------	--------	1	-------	10	0	-------	0	0	--------
Missouri:											
Kansas City	3	------	0	3	4	66	0	1	1	1	71
St. Joseph	0	------	0	0	3	1	1	1	0	1	24
St. Louis	4	1	0	3	15	27	0	13	0	5	248
North Dakota:											
Fargo	0	------	0	0	0	3	0	0	0	0	4
Grand Forks	0	------	--------	0	-------	0	0	-------	0	0	--------
South Dakota:											
Aberdeen	0	------	--------	0	-------	3	0	-------	0	0	--------
Nebraska:											
Omaha	1	------	0	22	5	21	4	6	0	0	74
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	4
Topeka	0	------	0	0	8	24	0	1	0	0	25
Wichita	0	------	0	0	1	17	0	0	0	5	17
Delaware:											
Wilmington	0	------	1	8	2	0	0	1	0	7	36
Maryland:											
Baltimore	4	3	0	284	16	17	0	9	0	41	201
Cumberland	0	------	0	0	1	0	0	0	0	0	12
Frederick	0	------	0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	9	------	0	148	8	20	0	11	0	41	161
Virginia:											
Lynchburg	0	------	0	0	1	0	0	0	0	17	14
Norfolk	0	------	0	0	3	1	0	2	0	0	19
Richmond	1	------	0	1	3	15	0	3	0	3	58
Roanoke	0	------	0	2	0	1	0	0	2	0	16
West Virginia:											
Charleston	0	------	0	0	0	0	0	0	0	0	16
Huntington	0	------	0	0	0	0	0	0	0	0	--------
Wheeling	0	------	0	31	0	0	0	0	0	0	14
North Carolina:											
Gastonia	0	------	0	1	1	0	0	0	0	0	7
Raleigh	0	------	0	0	0	0	0	1	0	7	19
Wilmington	1	------	0	0	0	0	0	0	0	0	9
Winston-Salem	0	1	1	7	2	0	0	2	1	0	19
South Carolina:											
Charleston	0	11	0	1	0	0	0	0	0	7	19
Columbia	------	------	--------	------	-------	------	------	-------	------	-------	--------
Florence	0	------	0	3	2	0	0	2	0	1	18
Greenville	0	------	0	1	5	0	0	0	0	1	32

City reports for week ended May 30, 1936

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Georgia:											
Atlanta	1	1	0	0	9	8	0	4	0	4	74
Brunswick	0	------	0	0	0	0	0	0	0	0	4
Savannah	0	------	0	0	2	1	0	1	1	0	28
Florida:											
Miami	0	4	2	3	1	0	0	0	0	4	19
Tampa	0	1	1	9	1	1	0	3	0	0	22
Kentucky:											
Ashland	------	------	------	------	------	------	------	------	------	------	------
Covington	0	------	0	2	0	3	0	3	0	0	14
Lexington	0	------	0	5	------	2	0	------	0	2	21
Louisville	1	1	0	40	9	4	0	1	1	7	62
Tennessee:											
Knoxville	0	------	1	1	2	0	0	0	2	0	21
Memphis	3	------	0	0	4	2	0	6	3	12	78
Nashville	0	------	0	10	2	3	0	1	0	0	39
Alabama:											
Birmingham	0	1	0	2	5	0	0	9	0	2	65
Mobile	0	------	0	1	3	0	0	0	0	0	19
Montgomery	2	------	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	------	------	------	------	------	------	------	------	------	------	------
Little Rock	1	------	0	1	0	0	0	0	0	0	------
Louisiana:											
New Orleans	3	------	4	4	7	3	0	11	1	53	144
Shreveport	0	------	0	3	4	2	0	1	1	0	40
Oklahoma:											
Oklahoma City	1	------	0	2	4	8	0	0	0	2	48
Texas:											
Dallas	3	1	1	103	5	0	0	0	0	1	70
Fort Worth	0	------	0	1	4	1	0	1	2	0	37
Galveston	2	------	0	3	4	1	0	0	0	0	12
Houston	4	------	1	0	6	1	0	6	0	0	62
San Antonio	5	------	2	8	4	0	0	10	1	0	79
Montana:											
Billings	0	------	0	0	0	3	1	0	0	2	8
Great Falls	0	------	0	0	0	1	0	0	0	3	5
Helena	0	------	0	0	0	3	0	0	0	0	8
Missoula	0	------	0	0	0	2	0	0	0	0	2
Idaho:											
Boise	0	------	0	1	0	1	0	1	0	0	5
Colorado:											
Colorado Springs	0	------	0	0	1	5	0	1	0	1	11
Denver	2	------	1	26	6	11	0	7	0	26	81
Pueblo	0	------	0	0	0	23	0	0	0	0	5
New Mexico:											
Albuquerque	0	------	0	16	0	14	0	1	0	0	6
Utah:											3
Salt Lake City	0	------	0	9	1	20	2	1	1	17	43
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	193	3	5	0	3	0	10	94
Spokane	0	------	0	9	0	20	0	0	0	4	28
Tacoma	0	------	0	25	1	2	0	0	0	2	27
Oregon:											
Portland	0	------	0	4	0	2	0	2	0	5	65
Salem	1	------	------	26	------	0	0	------	0	0	------
California:											
Los Angeles	7	10	0	217	14	48	0	21	1	49	293
Sacramento	0	------	0	1	2	7	0	3	0	11	83
San Francisco	1	1	0	120	8	64	0	4	1	25	156

City reports for week ended May 30, 1936—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Missouri:			
Boston	7	4	2	Kansas City	1	0	0
Rhode Island:				North Dakota:			
Providence	1	1	0	Fargo	1	0	0
New York:				Maryland:			
New York	4	2	0	Baltimore	3	1	0
Pennsylvania:				District of Columbia:			
Philadelphia	2	1	1	Washington	0	1	0
Pittsburgh	4	2	0	Virginia:			
Reading	1	0	0	Norfolk	1	1	0
Ohio:				Richmond	3	0	0
Cincinnati	1	0	0	North Carolina:			
Cleveland	2	0	0	Raleigh	0	1	0
Columbus	0	1	0	Wilmington	1	1	0
Indiana:				South Carolina:			
Indianapolis	0	1	0	Charleston	1	0	0
Illinois:				Kentucky:			
Chicago	3	1	0	Louisville	2	0	0
Springfield	1	0	0	Louisiana:			
Michigan:				New Orleans	1	0	0
Detroit	2	0	0	Texas:			
Wisconsin:				Houston	1	0	0
Milwaukee	1	0	0	California:			
Minnesota:				Los Angeles	0	1	2
Minneapolis	1	0	0				

Epidemic encephalitis.—Cases: Philadelphia, 1; Atlanta, 2.

Pellagra.—Cases: Charleston, S. C., 1; Brunswick, 1; Savannah, 4; Birmingham, 1; Mobile, 1; Montgomery, 1; New Orleans, 2; Dallas, 2; Los Angeles, 4.

Typhus fever.—Cases: Atlanta, 1; Mobile, 1.

FOREIGN AND INSULAR

CUBA

Provinces—Notifiable diseases—4 weeks ended May 2, 1936.—During the 4 weeks ended May 2, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	2	1	7	5	3	20
Chicken pox		39	4	14	4	9	70
Diphtheria	1	7		6	1	5	20
Hookworm disease	2						2
Leprosy		5		1			6
Malaria	94	22	12	456	127	1,562	2,273
Measles	1	5		4	12		22
Poliomyelitis	1		1	9		5	16
Tuberculosis	11	48	20	63	16	42	200
Typhoid fever	11	41	21	19	15	104	211

DENMARK

Vital statistics—1934.—Following are vital statistics for Denmark, exclusive of the Faroe Islands, for the year 1934:

Population	3,656,000		
Births	65,116	Influenza	230
Births per 1,000 population	17 8	Measles	13
Deaths	38,049	Mumps	4
Deaths per 1,000 population	10.4	Paradysentery	-
Deaths under 1 year of age	4,194	Paratyphoid fever	7
Deaths under 1 year of age per 100 live births	6.4	Pneumonia	3,396
Deaths from:		Poliomyelitis	107
Cancer	5,283	Puerperal fever	98
Diabetes mellitus	669	Scarlet fever	45
Diphtheria and croup	67	Syphilis	64
Epidemic catarrhal jaundice	21	Tetanus neonatorum	24
Epidemic cerebrospinal meningitis	40	Tuberculosis	
Epidemic encephalitis	29	Typhoid fever	17
Erysipelas	114	Whooping cough	104

ITALY

Communicable diseases—4 weeks ended March 29, 1936.—During the 4 weeks ended March 29, 1936, cases of certain communicable diseases were reported in Italy as follows:

Disease	March 2-8		March 9-15		March 16-22		March 23-29	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	13	11	4	3	9	8	16	13
Cerebrospinal meningitis	26	19	20	20	20	17	31	30
Chicken pox	478	152	356	134	368	137	389	152
Diphtheria and croup	543	271	433	263	439	244	464	255
Dysentery	5	5	6	6	4	4	7	5
Hookworm disease	9	4	8	5	5	4	11	6
Lethargic encephalitis	2	2	3	3	5	5	2	2
Measles	1,756	284	2,097	323	1,932	287	2,227	311
Paratyphoid fever	27	27	20	19	28	22	32	20
Poliomyelitis	5	5	10	9	16	14	12	11
Puerperal fever	34	33	32	31	28	20	32	29
Scarlet fever	274	123	310	141	254	120	290	122
Typhoid fever	205	123	153	108	184	126	197	125
Undulant fever	40	30	48	41	40	33	90	62
Whooping cough	374	113	389	111	467	123	527	124

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for May 29, 1936, pages 718–730 A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued June 26, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Smallpox

Argentina—Buenos Aires Province—Bahia Blanca—Punta Alta.—According to a report dated May 22, 1936, 26 cases of smallpox had occurred up to this date in Punta Alta, Bahia Blanca, Buenos Aires Province, Argentina.

Typhus Fever

Algeria—Algiers.—During the week ended May 16, 1936, 2 cases of typhus fever were reported at Algiers, Algeria.

Yellow Fever

Senegal—Tivaouane.—During the week ended May 30, 1936, 1 case of yellow fever was reported at Tivaouane, Senegal.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878, under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

Requests for and communications regarding the PUBLIC HEALTH REPORTS, reprints, or supplements should be addressed to the Surgeon General, United States Public Health Service, Washington, D. C. Subscribers should remit direct to the Superintendent of Documents, Washington, D. C.

Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

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RELATION OF PHYSICAL DEFECTS TO THE PHYSICAL GROWTH OF CHILDREN OF 21 STATES[1]

Physical Measurement Studies No. 3

By WILLIAM M. GAFAFER, *Senior Statistician, United States Public Health Service*

Over a half-century ago Bowditch (*1*) called attention to the importance of securing measurements relating to the physical growth of large numbers of children by enumerating some problems the investigation of which required such data. He mentioned geographic location, season, rural and urban residence, economic status, occupation, mode of life, and normal dental processes as factors to be studied in relation to growth, and particularly referred to the relationship of certain diseases of childhood to the rapid growth characteristic of early life. He pointed out, for example, that enlarged cervical glands and measles had been observed to be associated with decreases in weight before the appearance of more unequivocal signs; at the same time Bowditch cautioned that arrest of growth in weight or loss in weight in a growing child is not always a sign of approaching disease, since the weight of a healthy child fluctuates within ascertainable limits.

Since the appearance of the above-mentioned paper a voluminous literature dealing with its subject has accumulated. It is sufficient to add that Robertson (*2*), in 1916, reported that in a group of 8-year old children the presence of adenoids was related to decreased height and weight, and that Peller (*3*) more recently concluded from a study of girls, 13 to 15 years of age, that normal tonsils regulate physical growth by means of some hormonal factor.

In this, the third paper of the series, it is purposed to obtain some knowledge concerning the relation between physical defects in school children and their physical growth, rate of physical growth, and their body form, respectively, so far as it is determinable from the recorded results of examinations for physical defects and the records of certain physical measurements.

MATERIAL AND METHOD

Data collected by three officers of the United States Public Health Service in connection with the physical measurement of 28,674 white children, ages 6 to 15 years, in 21 States, afford material for the study

[1] From the Office of Child Hygiene Investigations, U. S. Public Health Service. The collected data on which the Physical Measurement Studies are based were edited, coded, and transferred to punch cards several years ago during the assignment of Dr. S. D. Collins to this office. Furthermore, many tabulations and computations were made at the same time. The author is indebted to Dr. Collins for placing all of this material at his disposal. The other papers of the series are mentioned in the list of references.

of the proposed question.[3] The geographic distribution of the children by State and community, the number measured, the dates of measurement, the methods of making the measurements, and other pertinent information are given in the previous papers (*4*, *5*) of the series and will not be repeated here.

The anthropometric measurements dealt with in the present report are seven in number and include body weight, standing and sitting heights, chest circumference, anteroposterior and transverse chest diameters, and vital capacity. In addition, the following four computed indexes of body form are employed:

$$\text{Weight-height (lbs. per in. of height)} = \frac{\text{mean weight in pounds}}{\text{mean height in inches}},$$

$$\text{Trunk-length, percent} = \frac{100\ (\text{mean sitting height in inches})}{\text{mean standing height in inches}},$$

$$\text{Thoracic, percent} = \frac{100\ (\text{mean anteroposterior chest diameter in cms.})}{\text{mean transverse chest diameter in cms.}},$$

$$\text{Chest-height, percent} = \frac{100\ (\text{chest circumference in inches})}{\text{standing height in inches}}.$$

The population measured is homogeneous in several respects: The children are native-born of white native-born parents and grandparents; excepting a few measured in the West, all lived in large urban areas, and none seriously ill is included, since all were attending school. Moreover, grossly defective or crippled children are excluded.

Almost one-half of the population measured, however, had physical defects of some kind recorded for it. These defects had been observed in the majority of the children by the local school medical officers shortly before the physical measurements were made, and were accepted and recorded by the medical officers of the Public Health Service as defects existing at the time of measuring. Those children who had not been previously examined for defects were examined for them by the officers making the measurements.

Nothing is known regarding the completeness of the examinations for defects nor the accuracy with which they were made in the various communities. For example, less than 33 percent of the children measured and examined were recorded as having carious teeth, alone, or in combination with other defects. This percent is remarkably low when compared with the findings of a recent dental survey of school children (*6*), and probably means that dental mouth mirrors and explorers were infrequently used or not used at all, and that

[3] The children were distributed, according to the officer making the measurements, as follows: Dr. Viola R. Anderson, 1,943; Dr. E Blanche Sterling, 9,377, and Dr M V. Veldee, 17,354. The 21 States are: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Minnesota, Wisconsin, Michigan, Indiana, Illinois, Texas, Louisiana, Arkansas, Tennessee, Kentucky, Missouri, Utah, and Nevada. The small number of 15-year old children measured are omitted from this paper.

pits and fissures were generally not included in the definition of dental caries. The results of the examinations, therefore, are probably of little value for precise epidemiological purposes, but it may be reasonably assumed that the records of the presence of defects are of sufficient accuracy and completeness for the purposes of the present study. Indeed, a classification of the children into "defectives" and "nondefectives" based on these records is probably more likely in this instance to yield significant results than one based on meticulous examinations leading, as they would, to the discovery of more defects in their early stages of development, and more defects of a transitory nature.

In the matter of definitions no attempt will be made to define generally a defect nor any particular defect. Table 1 is included to show the composition of the defective group. The particular defects are arranged according to the frequency of their occurrence, the one occurring most frequently appearing first. Thus, carious teeth, alone, were recorded as present in 58 percent of the defective group, defective tonsils or adenoids in 14 percent of the group, and so on. The large sex difference for the categories involving goiter is in harmony with the observations reported by Olesen (7), and Collins (8, p. 68).

TABLE 1.—*Children, ages 6 to 14, with recorded defects, classified according to specified defects*

Defect	Number			Percent		
	Both sexes	Boys	Girls	Both sexes	Boys	Girls
Defective (total)	12,717	6,326	6,391	100.00	100.00	100.00
Carious teeth only	7,387	3,892	3,495	58.09	61.52	54.69
Defective tonsils or adenoids	1,796	896	900	14.12	14.16	14.08
Defective tonsils or adenoids and carious teeth	1,138	601	537	8.95	9.50	8.40
Goiter	422	27	395	3.32	.43	6.18
Defective vision or other eye defect or disease	385	165	220	3.03	2.61	3.44
Defective vision or other eye defect or disease and carious teeth	276	142	134	2.17	2.24	2.10
Enlarged cervical or submaxillary glands and carious teeth	225	124	101	1.77	1.96	1.58
Enlarged cervical or submaxillary glands	141	75	66	1.11	1.19	1.03
Defective tonsils or adenoids, enlarged cervical or submaxillary glands and carious teeth	117	66	51	.92	1.04	.80
Goiter and carious teeth	92	6	86	.72	.09	1.35
Defective tonsils or adenoids, and enlarged cervical or submaxillary glands	64	36	28	.50	.57	.44
All other	674	296	378	5.30	4.68	5.91
Nondefective (total)	15,600	7,798	7,802			
Total, all children	28,317	14,124	14,193			

An attempt will be made to secure some information on the subject proposed by determining whether there is a difference between the physically defective group of children and the physically nondefective group with respect to, first, the means and yearly increments of the means, respectively, of the seven anthropometric measurements, and, second, the means of the four indexes of body form. All of the data are specific for sex and age.

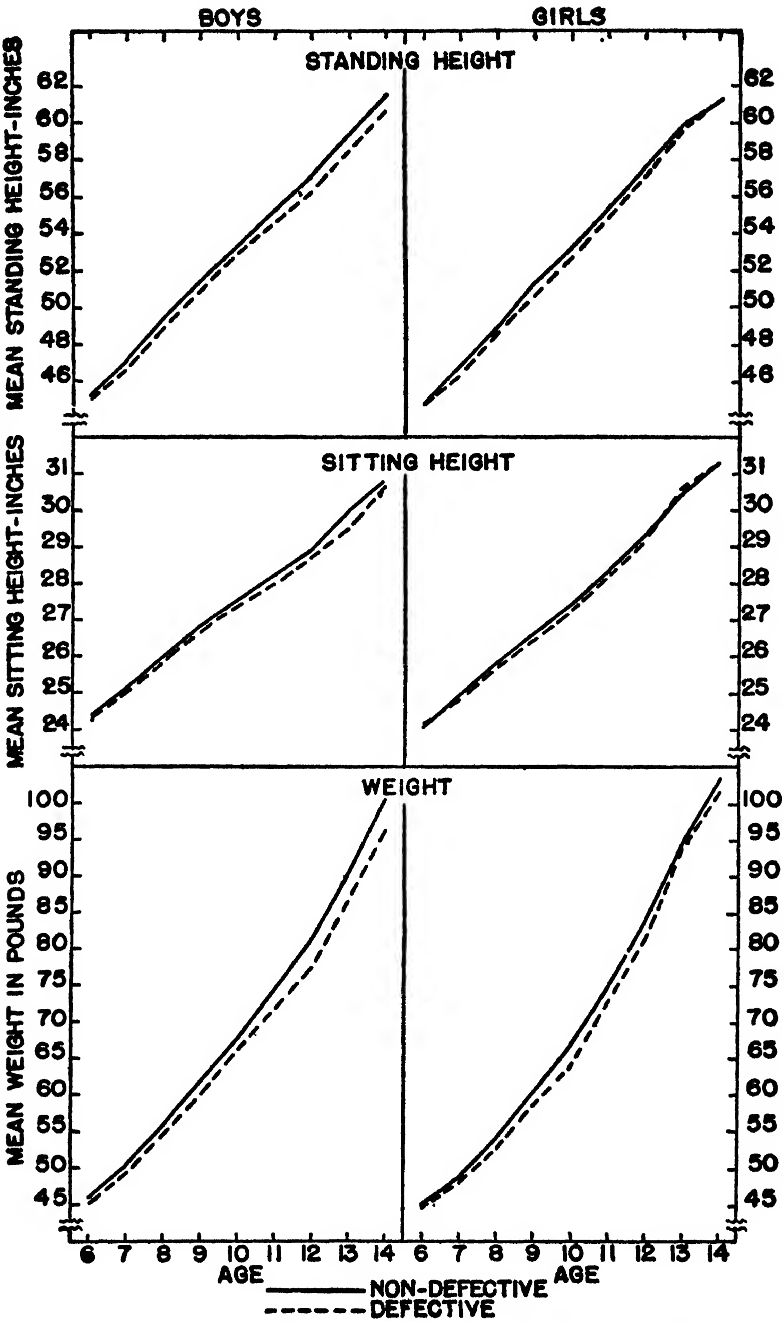

FIGURE 1.—Mean measurements of nondefective and defective children.

RESULTS

Growth of the nondefective and defective groups.—Table 2 presents for the two groups the sex-age specific means of the basic measurements and of the computed indexes of body form. The means for standing and sitting heights and for weight are shown graphically in figure 1. While the differences for both standing and sitting heights are small, the curves for the nondefective group are generally above the corresponding ones for the defective group. For the boys the differences for the two measurements are consistent; for the girls, on

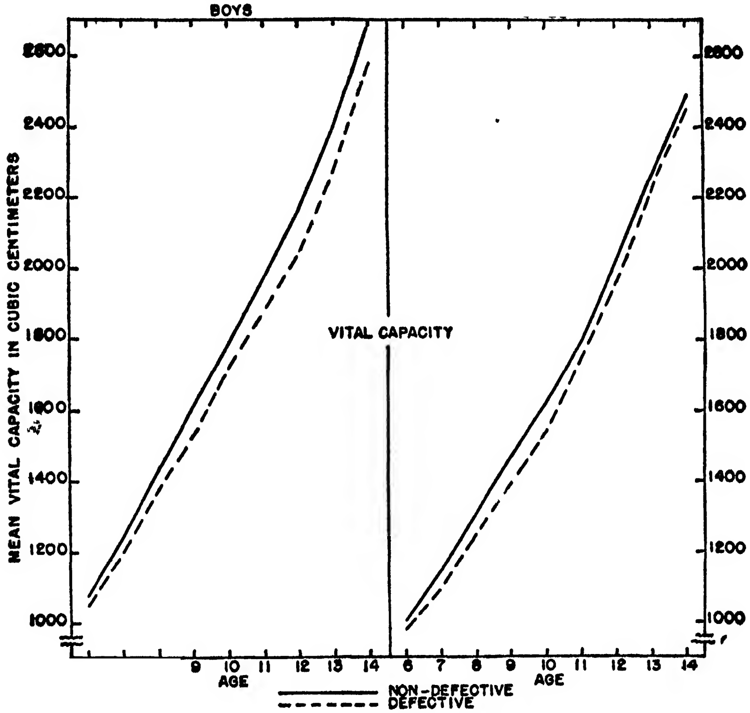

FIGURE 2.—Mean vital capacity of nondefective and defective children.

the other hand, the consistency is disturbed at both ends of the age range. There is evidence, however, to suggest that the nondefective group, on the average, is probably taller and has longer trunks. The differences with regard to weight are striking. The curves for both sexes of the nondefective group are consistently above those for the other group, the differences for the higher age groups lying in the neighborhood of 4 pounds for the boys and 2 pounds for the girls. With regard to vital capacity (fig. 2) the curves for the nondefectives of both sexes are again consistently above the corresponding curves for the defectives. The differences for the boys range from approximately 30 to 130 cubic centimeters, and for the girls, from 20 to 75.

The graphs of the three measurements dealing with chest circumference and the two chest diameters show no real differences for either sex as between the nondefective and defective groups and are omitted. It must be stated at this time, however, that when the States in which measurements were made are classified into a northeast, a north central, and a south central region, and the nondefective and defective groups within each region are compared, there is an indication that the nondefective group has, on the average, larger chests.[3]

TABLE 2.—*Mean measurements of nondefective and defective children*

[Defective group in *italics*]

Measurement and index	Age in years, nearest birthday: 6	7	8	9	10	11	12	13	14
Boys									
Weight, pounds	46 17	50 44	55 90	61 74	67 68	74 51	81 50	90 55	100 85
	45 36	*49 21*	*54 70*	*59 90*	*66 08*	*71 94*	*77 65*	*86 69*	*96 48*
Standing height, inches	45 28	47 28	49 49	51 59	53 41	55 39	57 18	59 35	61 47
	45 01	*46 84*	*49 07*	*51 00*	*53 00*	*54 68*	*56 27*	*58 46*	*60 74*
Sitting height, inches	24 38	25 15	26 03	26 82	27 54	28 23	28 92	29 84	30 84
	24 36	*25 06*	*25 92*	*26 71*	*27 41*	*28 04*	*28 72*	*29 62*	*30 70*
Chest circumference, inches	22 70	23 28	23 91	24 58	25 25	26 00	26 83	27 79	28 96
	23 09	*23 38*	*24 07*	*24 62*	*25 35*	*26 14*	*26 84*	*27 87*	*29 09*
Transverse chest diameter, centimeters	18 88	19 42	20 01	20 59	21 17	21 80	22 47	23 24	24 12
	19 29	*19 54*	*20 13*	*20 73*	*21 31*	*21 99*	*22 65*	*23 54*	*24 54*
Anteroposterior chest diameter, centimeters	14 15	14. 47	14. 69	15 04	15 42	15 84	[illegible] 29	16 86	17 60
	14 49	*14 55*	*14 81*	*15 15*	*15 48*	*15 95*	*16 29*	*16 96*	*17 72*
Vital capacity, cubic centimeters	1,076	1,241	1,430	1,614	1,785	1,975	2 167	2,405	2,694
	1,047	*1,197*	*1,378*	*1,525*	*1,721*	*1,881*	*2,044*	*2,273*	*2,583*
Weight over height, pounds per inch of height	1 020	1 067	1 130	1 197	1 267	1 345	1 425	1 526	1 641
	1 008	*1 051*	*1 115*	*1 175*	*1 247*	*1 316*	*1 380*	*1 481*	*1 589*
Sitting height over standing height, percent	53 83	53 19	52 59	51 99	51 56	50 96	50 58	50 29	50 17
	54 14	*53 51*	*52 83*	*52 39*	*51 71*	*51 28*	*51 04*	*50 49*	*50 55*
Anteroposterior chest diameter over transverse chest diameter, percent	74 95	74 49	73 40	73 02	72 85	72 64	72 49	72 53	72 97
	75 38	*74 46*	*73 55*	*73 06*	*72 62*	*72 51*	*71 93*	*72 04*	*72 29*
Chest circumference over standing height, percent	50 13	49 23	48 31	47 65	47 29	46 93	46 93	46 82	47 11
	51 30	*49 91*	*49 06*	*48 28*	*47 83*	*47 81*	*47 69*	*47 67*	*47 77*
Girls									
Weight, pounds	45 25	48 95	54 26	60 47	66 94	75 18	84 17	94. 90	103 67
	44 53	*48 21*	*52 62*	*58 77*	*64 26*	*73 03*	*81 90*	*94 20*	*101 87*
Standing height, inches	44 77	46 94	49 10	51 30	53 20	55 44	57 63	59 90	61 21
	44 85	*46 40*	*48 77*	*50 60*	*52 65*	*54 80*	*57 24*	*59 80*	*61 24*
Sitting height, inches	24 13	24 99	25 84	26 67	27 43	28 37	29 36	30 49	31 33
	24 27	*24 83*	*25 74*	*26 45*	*27 25*	*28 23*	*29 22*	*30 63*	*31 33*
Chest circumference, inches	22 08	22 69	23 33	24 11	24 87	25 81	26 78	27 92	28 78
	22 58	*23 02*	*23 42*	*24 17*	*24 89*	*26 06*	*27 01*	*28 17*	*28 96*
Transverse chest diameter, centimeters	18 37	18 84	19 41	20 02	20 60	21 34	22 01	22 86	23 47
	18 79	*19 16*	*19 50*	*20 09*	*20 72*	*21 56*	*22 27*	*23 07*	*23 69*
Anteroposterior chest diameter, centimeters	13 72	14 00	14 33	14. 72	15 19	15 69	10 38	17 13	17 77
	13 99	*14 18*	*14 45*	*14 81*	*15 28*	*15 94*	*16 55*	*17 41*	*17 88*
Vital capacity, cubic centimeters	1,004	1,144	1,311	1,471	1,624	1,802	2,034	2,272	2,486
	982	*1,098*	*1,255*	*1,395*	*1,549*	*1,755*	*1,971*	*2 233*	*2,440*
Weight over height, pounds per inch of height	1 011	1 043	1 105	1 179	1 258	1 356	1 460	1 584	1 694
	0 993	*1 039*	*1 079*	*1 162*	*1 221*	*1 333*	*1 431*	*1 576*	*1 663*
Sitting height over standing height, percent	53 90	53 25	52 63	51 98	51 55	51 16	50 94	50 91	51 19
	54 02	*53 51*	*52 78*	*52 28*	*51 76*	*51 52*	*51 05*	*51 23*	*51 15*
Anteroposterior chest diameter over transverse chest diameter, percent	74 65	74 32	73 84	73 53	73 73	73 51	74 43	74 93	75 70
	74 46	*74 03*	*73 89*	*73 71*	*73 73*	*73 94*	*74 31*	*75 44*	*75 50*
Chest circumference over standing height, percent	49 32	48 33	47 51	47 00	46 75	46 56	46 47	46 61	47 01
	50 35	*49 62*	*48 02*	*47 76*	*47 27*	*47 55*	*47 18*	*47 11*	*47 29*

NUMBER OF CHILDREN

	6	7	8	9	10	11	12	13	14
Boys	524	727	785	848	836	986	1,079	1,123	890
	398	*873*	*894*	*965*	*862*	*749*	*635*	*523*	*427*
Girls	506	740	796	858	959	989	1,075	1,030	849
	460	*808*	*856*	*922*	*813*	*729*	*661*	*627*	*515*

[3] The western region represented by Nevada and Utah is omitted because of the relatively small number of children measured there The relation of physical defects to physical growth in different geographic regions will be considered in the next paper of the series [Am Jour Hyg , 23: 205-215 (1936)].

A consideration of the graphical presentation (fig. 3) of the four mean indexes follows. With the exception of the index expressing relative chest depth or what percent the anteroposterior chest di-

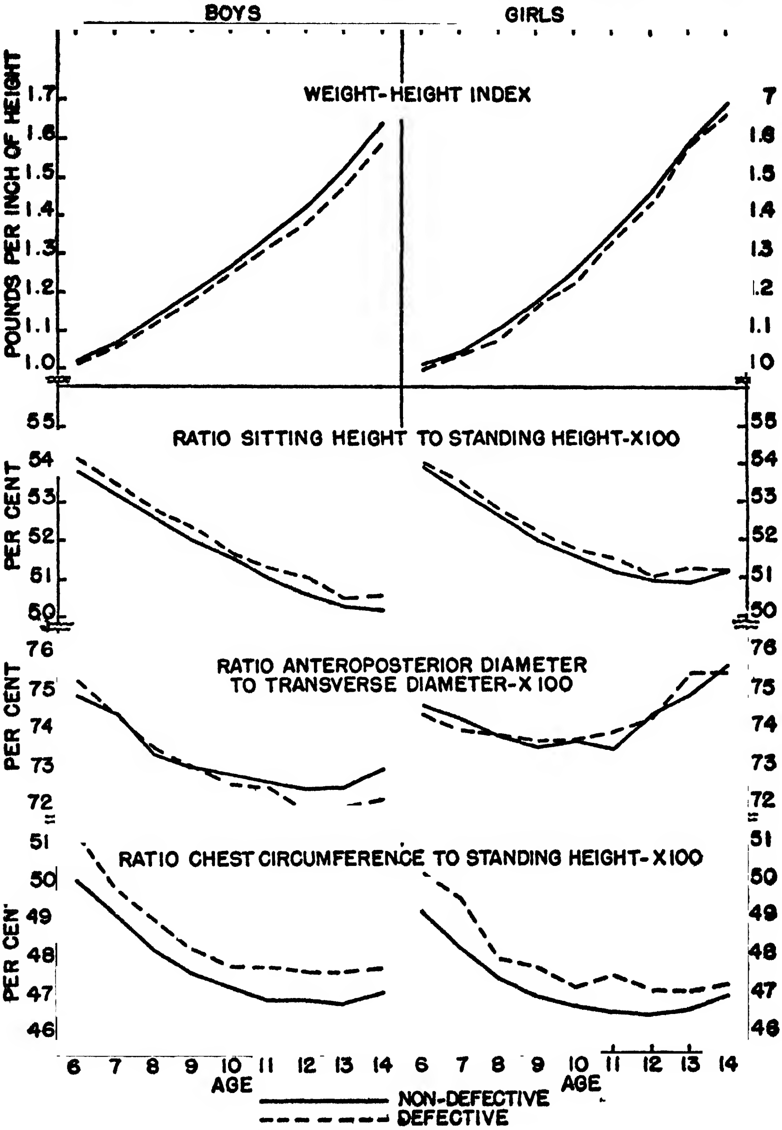

FIGURE 3.—Mean indexes of body form of nondefective and defective children.

ameter is of the transverse chest diameter, all indexes for one group, for both sexes, are consistently above or below the corresponding indexes for the other group. The actual differences between the two groups of children are all small.

Thus the weight-height index in pounds per inch of height is consistently larger for both sexes of the nondefective group, the differences being not more than 0.05 pound per inch of height. The

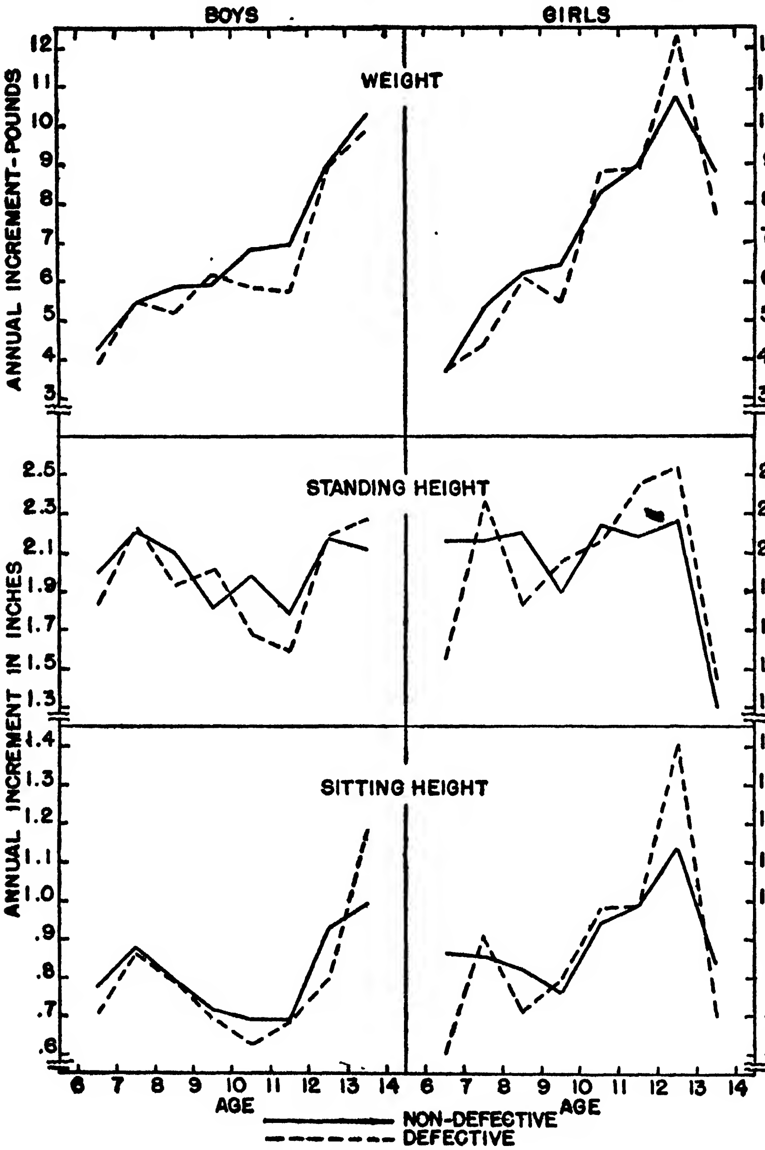

FIGURE 4.—Mean annual increments of growth of nondefective and defective children.

children of the nondefective group are, therefore, on the average, stockier than those of the defective group. The index of relative trunk length, or the percent that the sitting height is of the standing

height, is smaller for both sexes of the nondefective group, the differences being generally less than 0.4 percent. The nondefective group has, therefore, on the average, relatively short trunks. The curves of the index of relative chest depth, as referred to above, show

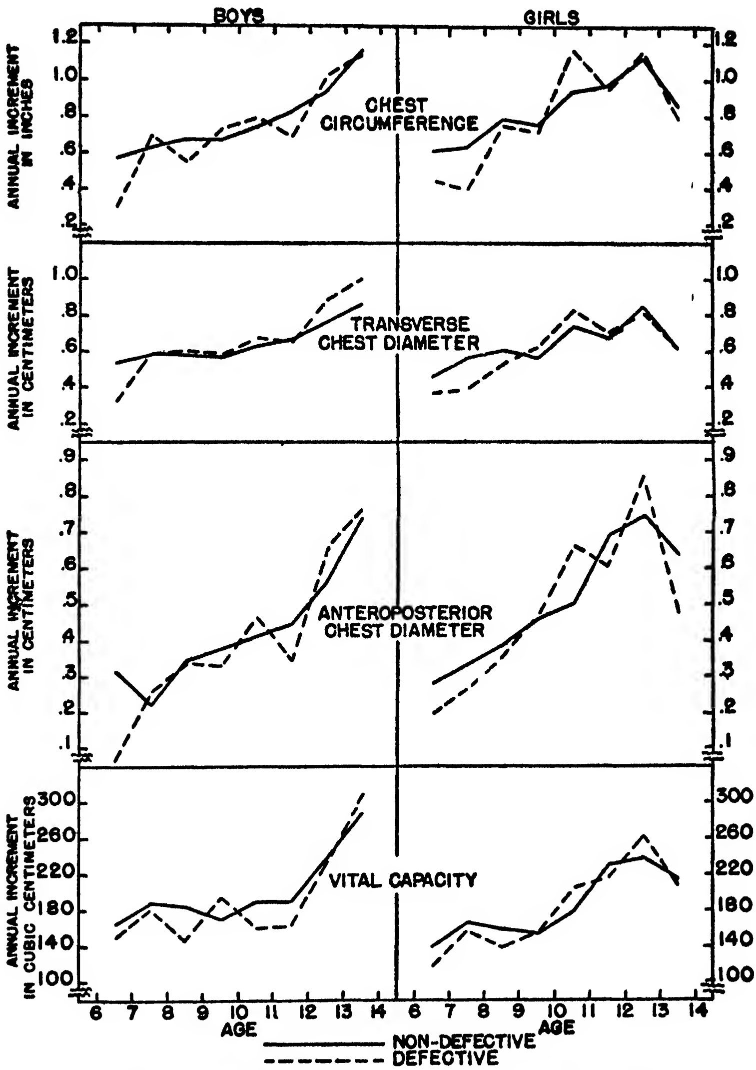

FIGURE 5.—Mean annual increments of growth of nondefective and defective children

no consistent differences for either sex. In other words, with respect to relative flatness or relative thickness of the chest, the two groups are probably not different. The index expressing chest circumference in relation to height is for both sexes, on the average, consistently

smaller for the nondefective group. None of the differences for either sex is much over 1 percent.

Rate of growth of the nondefective and defective groups.—The differences between pairs of mean measurements of successive age groups are given in table 3 and shown graphically in figures 4 and 5. None of the graphs shows consistent differences as between the nondefective and defective groups. The material, therefore, presents no definite evidence of differences in rates of growth as between the two groups with respect to weight, standing and sitting heights, chest circumference, transverse and anteroposterior chest diameters, and vital capacity.

TABLE 3.—*Mean annual increments in the measurements of nondefective and defective children*

[Defective group in *italics*]

Measurement	Age interval 6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14
	Boys							
Weight, pounds	4 268	5.456	5.846	5.934	6.827	6.995	9.047	10.307
	3.846	*5 486*	*5.202*	*6.184*	*5.858*	*5.707*	*8.938*	*9.897*
Standing height, inches	1.998	2 206	2.102	1.816	1.984	1.786	2.172	2.120
	1.835	*2.227*	*1.929*	*2.007*	*1.675*	*1.589*	*2.197*	*2.273*
Sitting height, inches	.771	.878	.794	.716	.690	.690	.928	.995
	.700	*.860*	*.790*	*.694*	*.629*	*.683*	*.798*	*1.185*
Chest circumference, inches	.578	.633	.672	.673	.743	.837	.955	1.169
	.291	*.693*	*.551*	*.752*	*.788*	*.694*	*1,035*	*1.145*
Transverse chest diameter, centimeters	.542	.592	.580	.577	.636	.665	.772	.876
	.324	*.586*	*.600*	*.584*	*.679*	*.659*	*.885*	*1.002*
Anteroposterior chest diameter, centimeters	.317	.222	.349	.385	.417	.449	.569	.741
	.064	*.254*	*.340*	*.333*	*.469*	*.345*	*.662*	*.768*
Vital capacity, cubic centimeters	164.8	189.1	184.7	170.5	190.5	191 5	238.5	288 5
	149.9	*180.4*	*147.1*	*196 2*	*160.1*	*162.7*	*229.2*	*309.9*
	Girls							
Weight, pounds	3.701	5.311	6.2[illegible]1	6.464	8.244	8.988	10.729	8.774
	3.677	*4.408*	*6.153*	*5.492*	*8 766*	*8.873*	*12.302*	*7.662*
Standing height, inches	2.166	2 165	2.202	1.898	2.242	2.187	2.266	1.309
	1.548	*2.372*	*1.828*	*2.048*	*2.150*	*2.444*	*2.544*	*1.459*
Sitting height, inches	.862	.853	.822	.760	.940	.990	1.137	.840
	.603	*.909*	*.714*	*.796*	*.983*	*.989*	*1.405*	*.701*
Chest circumference, inches	.606	.639	.787	.757	.943	.969	1.133	.860
	.446	*.401*	*.746*	*.719*	*1.170*	*.948*	*1.162*	*.793*
Transverse chest diameter, centimeters	.462	.578	.611	.574	.745	.669	.851	.608
	.373	*.395*	*.529*	*.635*	*.837*	*.710*	*.805*	*.615*
Anteroposterior chest diameter, centimeters	.283	.336	.390	.462	.504	.693	.749	.636
	.195	*.265*	*.356*	*.471*	*.663*	*.607*	*.560*	*.477*
Vital capacity, cubic centimeters	140.0	167.1	159.2	153.6	178.0	231.9	237 9	213.6
	116.6	*156.7*	*139.9*	*154.3*	*205.9*	*215.7*	*262.2*	*207.2*

SUMMARY

The purpose of this paper, the third of the series, is the comparison of the physical growth and the rate of physical growth, respectively, of two groups of elementary school children, one group being without

and the other with physical defects. The comparison is made with respect to, first, seven physical measurements; second, the annual increments of the measurements; and, finally, four computed indexes of body form. The defects include, principally, carious teeth, defective tonsils and adenoids, goiter, enlarged cervical and submaxillary glands, and defective vision. The physical measurements are body weight, standing and sitting heights, chest circumference, transverse and anteroposterior chest diameters, and vital capacity. The indexes are weight over height, sitting height over standing height, anteroposterior chest diameter over transverse chest diameter, and chest circumference over standing height. All of the measurements are specific for sex and age.

The material for the study is furnished by the records of physical examinations and physical measurements of approximately 30,000 elementary school children of 21 States. The parents and grandparents of the children were all white native-born. Almost one-half of the children had one or more recorded physical defects.

While the actual differences in the mean physical measurements between the two groups of children were found generally to be small, they are, with one or two exceptions, in the same direction for both sexes. Thus the nondefective group is, on the average, taller and heavier and has longer trunks and greater vital capacity. The indexes showed the nondefective group to be stockier; in relation to height, the nondefectives have short trunks and small chest girths. The two groups showed no consistent differences between them in their rate of growth as measured by mean annual increases in each of the seven physical measurements.

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DISTRIBUTION AND HOSTS OF THE HUMAN FLEA, *PULEX IRRITANS* L., IN MONTANA AND OTHER WESTERN STATES[1]

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With the recent recognition of sylvatic plague in Montana and Oregon, data on the distribution and host relationships of fleas in these States, particularly those species known to attack man, assume a new interest. For this reason, the authors have prepared and present here records, most of them obtained recently, of the human flea, *Pulex irritans* L., which show its definite association with a plague-susceptible native rodent, wild carnivores, game animals, and household pets within these States.

P. irritans has been recorded by Ewing (1931) from Wyoming (no host or locality data) and by Jordan and Rothschild (1908) from Alberta, Canada, which border Montana on the south and north, respectively. The Alberta specimens were from the swift fox, *Vulpes velox*, and the wild cat, *Lynx* sp.

In July 1935, a single male flea collected from a prairie dog, *Cynomys ludovicianus* (Rodentia: Sciuridae) in Jefferson Canyon, Broadwater County, Mont., March 1934, by Jellison and William Rush, of the United States Biological Survey, was identified as *P. irritans* by B. J. Collins, of the Zoological Division, National Institute of Health. This was the first record of this species in Montana.

In order to verify this finding, 10 additional prairie dogs from well separated points in the dog town were examined on August 16, 1935. Of the 140 fleas collected, 124 were *P. irritans*, some on each animal. Only 16 were the true prairie dog flea, *Opisocrostis hirsutus* (Baker).

This prairie dog town, probably the most western in Montana, extends from the Jefferson River bridge at Three Forks north for several miles and west along the Jefferson River for at least 15 miles. There are but few ranches within the dog-town limits, and the quite heavy infestation observed can hardly be attributed to accidental parasitism by fleas dropped from domestic dogs or other hosts, but is due, rather, to well-established infestations of the burrows and nests of the rodents.

One male *P. irritans* was collected on W. L. J. near Dillon, Beaverhead County, Mont., in July 1935, and probably came from a ranch dog.

Through the cooperation of R. E. Bateman, district agent of the United States Biological Survey, a number of collections of fleas, taken in various parts of Montana from domestic dogs and coyotes (*Canis latrans*) by predatory animal trappers, have been received. Most of

[1] Contribution from the Rocky Mountain Laboratory, U. S. Public Health Service, Hamilton, Mont.

these fleas were *P. irritans*, and they furnish the following Montana records for 1935: Dog and coyote, Powell County, August; dog and coyote, Petroleum County, August; coyote, Glacier County, August, October, and November; dog and coyote, Bighorn County, September; coyote, Lake County, October; coyote, Yellowstone County, October; dog and coyote, Treasure County, October; dog, Powder River County, October; dog and coyote, Meagher County, November; dog and coyote, Prairie County, December. One vial of coyote fleas contained 191 specimens.[3]

The above records show that *P. irritans* is well established in many parts of Montana on native hosts as well as on dogs. The accompanying map shows the known distribution of the species within the State.

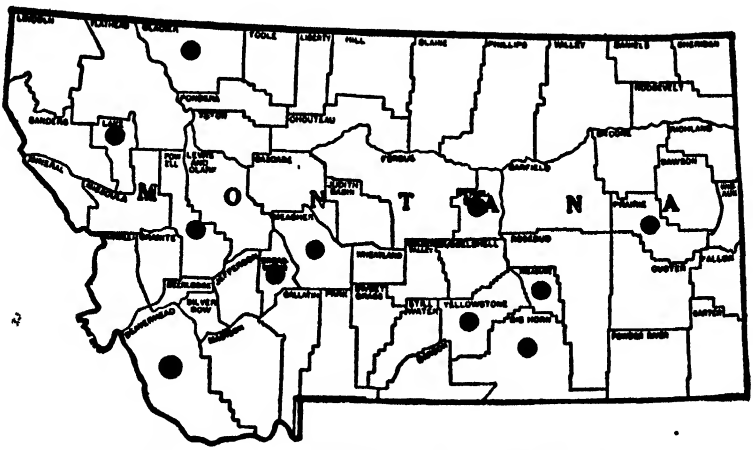

FIGURE 1.—Locality records of *Pulex irritans* L. in Montana

That this flea may occur frequently on coyotes in other western States is suggested by three collections from this host made by Kohls—one at Sanford, Colo., May 1932 (1 specimen); one in Josephine County, Oreg., August 1935 (2 specimens); the other in the vicinity of Desert Center, Riverside County, Calif., September 1935 (25 specimens).

A deer (*Odocoileus* sp.) killed September 22, 1935, in the Siskiyou National Forest in the extreme northeastern part of Curry County, Oreg., was found heavily flea-infested when examined several hours after death by two members of the Civilian Conservation Corps, who were collecting ticks and other parasites under direction of the United States Public Health Service Rocky Mountain Laboratory. Specimens received at the laboratory were identified as *P. irritans*. Forest

[3] Since this paper was prepared and submitted for publication, the following additional Montana collections have been identified as *P. irritans:* From a coyote, Madison County, 1936; a large series of gravid females from coyote dens, Glacier County, May 1936; and a previously unidentified collection made in July 1916 from a coyote in Powder River County by R. R. Parker and R. W. Wells.

rangers and other residents of the region report that deer are frequently heavily flea infested. The only prior record of *P. irritans* on this host is that of Chandler (1926), who states that F. C. Clarke found them in considerable numbers on *Odocoileus columbianus* in northern California.

The possibility that this flea might be associated with burrowing animals was suggested by Ewing (1931). In this paper Ewing listed all available records of *P. irritans* in the United States. In a group of six contiguous western States the species had been found in only two, and these were each represented by a single record. On the basis of these data he concluded that the species was of rare occurrence in the region comprised of the Great Basin and Rocky Mountains.

It seems likely, however, in view of the diverse host data and the number of locality records which we have obtained in a relatively brief period, that *P. irritans* has been a well-established species in this region for some time and that further field studies will increase the list of host animals and add extensively to the locality data.

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POOLED-FLEA INOCULATIONS REVEAL PLAGUE-INFECTED AREAS IN CALIFORNIA

In a letter, dated June 10, to Dr. W. M. Dickie, executive officer of the California State Department of Health, Dr. K. F. Meyer, director of the Hooker Foundation for Medical Research, University of California, reports that plague infection has been proved in certain areas in Modoc and Ventura Counties, Calif., by the method of pooled-flea inoculation of guinea pigs, described by Surg. C. R. Eskey in the Public Health Reports for June 12, 1936 (p. 786).

Doctor Meyer states that, owing to a shortage of guinea pigs in the laboratory, the batches of fleas sent in from the field in buffer salt solution were kept in the refrigerator for varying periods of time before inoculating them into guinea pigs. Three general pools of fleas collected from ground squirrels were found positive for plague, as follows: (1) 1 batch of 71 fleas and another batch of 44 fleas from 2 different ranches in Modoc County—guinea pig inoculated June 3 died of acute septicemic plague on June 8; (2) 9 different collections from Ventura County, pooled and inoculated into a guinea pig on June 3; animal died of acute septicemic plague on June 9; (3) 33 fleas from 104 squirrels anatomically free from plague, from 3 dif-

ferent regions in Modoc County, pooled and inoculated into a guinea pig on June 3. Animal died of acute septicemic plague on June 10.

Dr. Meyer makes the following comment regarding the application of the method of pooled-flea inoculation in determining plague infection:

"These observations leave no doubt that the method developed by Doctor Eskey is exceedingly valuable and should be more universally used. I personally feel that we should give the matter considerable thought. It is not unlikely that dogs might be prominent disseminators."

THE CHICAGO OUTBREAK OF AMEBIC DYSENTERY IN 1933 [1]

An epidemic of amebic dysentery had its origin in Chicago during the summer and fall of 1933. This was the first recognized water-borne outbreak, and the only known extensive epidemic of this disease in a civilian population.

During the period of the epidemic there were approximately 8,500,000 out-of-town visitors to Chicago, with resulting unusual congestion of downtown hotels and public eating places. Chiefly involved in the epidemic were two neighboring large downtown hotels. They had in part a common water supply. Incomplete reporting brought to light a total of 1,409 cases, of which more than two-thirds were in out-of-town visitors.

Only one focus was discovered which accounted for any considerable number of cases; namely, the two hotels. The infection was spread within the hotels from about June 1 to December 31, 1933, with a particularly high incidence late in June, during the latter half of August, and early in October. The incidence of carriers was high among employees of the two hotels.

The two major points of possible pollution which are considered to have resulted in water-borne infections in the hotels were as follows: (*a*) Two cross-connections in hotel X which joined an overhead sewer to condenser-water discharge pipes. This water, which had been first used for cooling purposes, was distributed throughout hotel X and to the upper floors of hotel Z. The pollution of this water would account for the observed parallelism of the incidence of infection in the two hotels. (*b*) An old, rotting, wooden plug in an overhead sewer which permitted leakage into the cooled drinking-water tank below. This would account for infections among guests and patrons only in hotel X, because this water system was limited to that hotel.

[1] A report on this outbreak has recently been issued by the Public Health Service as National Institute of Health Bulletin No. 166. The investigation was conducted jointly by representatives of the Board of Health of the city of Chicago, the Division of Water Purification, Bureau of Engineering, Department of Public Works of Chicago, and the United States Public Health Service.

Efforts were made to control the outbreak by the elimination of carriers of cysts of *E. histolytica* from among the food-handling staffs, but there is no evidence that these efforts were successful.

The measures required to prevent the recurrence of such an epidemic are the following: (*a*) Effective supervision of the installation of plumbing in new buildings and of changes in old ones; (*b*) reasonably frequent inspections of the water and sewage systems of buildings, especially of the older ones; (*c*) particular attention to the elimination of hazardous cross-connections, through preventing their installation and through detecting and removing existing ones.

Institutions serving the public, particularly those providing residence, meals, or beverages, should be encouraged, aided, and required to provide adequately for the protection of the public health. Properly trained sanitarians should more commonly be included in the personnel of such organizations.

DENTAL SURVEY OF ELEMENTARY SCHOOL CHILDREN OF 26 STATES

A report on a dental survey of approximately 1,500,000 elementary school children made in 1933–34 by the United States Public Health Service, in cooperation with the committee for dental health survey of the American Dental Association, has been recently published by the Public Health Service.[1] Of the total number, 1,356,435 white and 81,883 colored children were examined, each of which groups is approximately equally divided in respect of sex. The examinations were performed by about 8,000 practicing dentists in 648 counties of the following States: Arizona, California, Colorado, Florida, Georgia, Indiana, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Utah, Virginia, West Virginia, and Wisconsin. In four of the participating States, namely, Indiana, Minnesota, New Jersey, and Tennessee, the attempt was made to examine as many of the children below the ninth grade as possible; the percentages examined, based on estimated populations, are 43, 45, 39, and 48, respectively. The number of children examined in the four States is approximately 1,000,000.

The bulletin consists primarily of tabulations with the data classified according to the community in which the examinations were made, color, sex, and the three age groups 6–8, 9–11, and 12–14 years. Communities with populations between 5,000 and 10,000, and communities with populations less than 5,000, however, are each combined by county.

[1] Dental survey of school children, ages 6–14 years, made in 1933–34 in 26 States, by C. T. Messner, W. M. Gafafer, F. C. Cady, and H. T. Dean. Public Health Bul. No. 226, Government Printing Office, Washington, D. C., 1936.

The dental data deal with two major subjects, namely, (*a*) present dental needs and oral pathology, and, (*b*) past dental treatment; each tabulation corresponding to a community or group of communities further classifies the major subjects. Thus, under the first subject (*a*) are given the percent of the children needing treatment and prophylaxis, respectively; the percent with gingivitis; the percent with carious deciduous teeth; the number of caries of the deciduous teeth per 100 children; the percent with carious permanent teeth; the number of caries of the permanent teeth per 100 children; the percent with deciduous teeth that require extraction, and the number per 100 children; the percent with permanent teeth that require extraction, and the number per 100 children; the percent with slight and severe mal-occlusion, respectively; and the percent to which orthodontic treatment was recommended.

Under the second subject (*b*), namely, past dental treatment, are included the percent that had received dental treatment prior to the examination; the percent with a history of odontexesis; the percent with fillings in the deciduous and (or) permanent teeth; the percent with filled deciduous teeth, and the number per 100 children; the percent with filled permanent teeth, and the number per 100 children; and the percent with extracted permanent teeth together with the number per 100 children.

It is believed that the tabulations give an approximation of the oral conditions of a large cross-section of the elementary school population of the United States, and that a comparison of the observations from a particular area in respect of color, sex, or age will probably yield a suggestion of the influence of these factors on oral conditions.

It is impossible to summarize here the vast amount of data presented, but it will be of interest to examine the summations of the data for some of the items relating to dental needs as observed in the four States, Indiana, Minnesota, New Jersey, and Tennessee, where more than two-thirds of the examinations were made.

In all four States the percent of the white children needing dental treatment varies from 81 to 94; for the colored children of Tennessee, where the majority of the 81,883 colored was examined, the percent varies from 91 to 94. In general, the highest percents for each sex are associated with the children of the middle age group, 9 to 11 years. The boys of all age groups and of both colors show slightly higher percents than the girls of the corresponding groups.

The number of caries of the deciduous teeth per 100 white children of the age group 6 to 8 years, for example, varies from 151 to 194. The rates for the colored boys and girls of Tennessee are 109 and 102, respectively. In all four States the boys show slightly higher

rates than the girls. The number of deciduous teeth per 100 children of the same age group, the extraction of which was indicated, varies from 87 to 151. The rates for the colored boys and girls of Tennessee are 71 and 60, respectively. In the four States the boys show higher rates than the girls.

The number of caries of the permanent teeth per 100 white children of the age group 10 to 14 years, for example, varies from 210 to 309. For the colored boys and girls of Tennessee the rates are 126 and 136, respectively. In the four States the girls show higher rates than the boys. The number of permanent teeth per 100 children of the same age group, the extraction of which was indicated, varies from 12 to 57. The rates for the colored boys and girls of Tennessee are 18 and 19, respectively. With the exception of Indiana, where the rate for the boys is lower than that for the girls, the rates for the other three States are almost identical in respect of sex.

DEATHS DURING WEEK ENDED JUNE 6, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 6, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	8,316	8,154
Deaths per 1,000 population, annual basis	11.6	11.4
Deaths under 1 year of age	487	570
Deaths under 1 year of age per 1,000 estimated live births	44	52
Deaths per 1,000 population, annual basis, first 23 weeks of year	13.2	12.4
Data from industrial insurance companies.		
Policies in force	68,357,506	67,830,119
Number of death claims	12,721	13,156
Death claims per 1,000 policies in force, annual rate	9.7	10.1
Death claims per 1,000 policies, first 23 weeks of year, annual rate	10.8	10.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 13, 1936, and June 15, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 13, 1936, and June 15, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935
New England States:								
Maine	1	1			172	260	0	0
New Hampshire					7		0	0
Vermont		1			158	16	0	0
Massachusetts	7	12			1,084	334	5	1
Rhode Island	2	2			22	472	1	0
Connecticut		2		1	213	667	2	0
Middle Atlantic States:								
New York	41	34	[1] 3	([1])	2,546	2,904	13	15
New Jersey	10	14	4	2	430	2,007	8	5
Pennsylvania	15	26			875	1,586	2	4
East North Central States:								
Ohio	16	24	29	53	725	1,927	5	6
Indiana	5	20	4	5	9	129	1	1
Illinois	59	61	22	34	26	1,068	6	10
Michigan	6	8	1		75	2,356	3	2
Wisconsin	1	8	4	25	168	1,651	1	0
West North Central States:								
Minnesota	0	2	1	2	199	190	8	4
Iowa	2	16		5	5	121	3	4
Missouri	18	13	22	54	14	195	8	6
North Dakota		2			3	84	0	3
South Dakota		2				17	0	0
Nebraska	1		8		19	89	1	2
Kansas	8	13	1	17	14	321	0	0
South Atlantic States:								
Delaware	1	3			10	9	0	1
Maryland [2, 3]	6	5	1	2	333	98	8	9
District of Columbia [3]	7	2			125	30	3	0
Virginia [3]	9	4			81	183	4	10
West Virginia	4	13	11	26	95	213	6	4
North Carolina [4]	7	5		2	25	56	5	5

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 13, 1936, and June 15, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935
South Atlantic States—Continued.								
South Carolina [4]	6	1	25	56	80	18	3	0
Georgia [4]	7	3					1	0
Florida [4]		6	7	1	11	9	1	0
East South Central States:								
Kentucky [4]	5	2	11	3	16	179	3	1
Tennessee	8	6	8	5	11	21	3	2
Alabama [4]	3	7	6	30		68	4	0
Mississippi [3]	6	5					0	0
West South Central States:								
Arkansas		5	10	47	11	35	1	0
Louisiana	11	9	22	15	15	90	3	0
Oklahoma [5]			27	10	5	36	1	0
Texas [4]	25	20	78	31	125	22	0	4
Mountain States:								
Montana [3]			19	21	14	202	0	1
Idaho [3]	1				1	19	0	0
Wyoming [3]				1		5	0	0
Colorado	4	4			25	238	0	0
New Mexico	2		1	1	56	7	1	1
Arizona	5	1	8		70	7	0	1
Utah [3]					19	3	0	0
Pacific States:								
Washington					199	365	1	2
Oregon [3]	1	4			63	144	0	1
California	25	30	212	30	1,135	1,097	5	3
Total	330	391	540	479	9,239	19,498	100	108
First 24 weeks of year	12,453	14,715	138,082	101,610	238,920	641,383	5,253	3,403

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935
New England States:								
Maine	0	0	7	21	0	0	1	1
New Hampshire	0	0	3	2	0	0	0	0
Vermont	0	0	7	2	0	0	9	0
Massachusetts	2	1	188	188	0	0	1	1
Rhode Island	0	0	23	5	0	0	2	0
Connecticut	0	0	42	77	0	0	1	2
Middle Atlantic States:								
New York	2	1	607	748	0	0	11	7
New Jersey	1	1	174	162	0	0	4	4
Pennsylvania	0	0	261	373	0	0	12	10
East North Central States:								
Ohio	0	1	270	446	0	4	8	9
Indiana	0	1	63	77	4	0	4	3
Illinois	1	2	431	950	19	2	6	4
Michigan	0	0	375	216	0	0	7	4
Wisconsin	0	1	361	365	5	3	1	0
West North Central States:								
Minnesota	0	2	150	220	3	7	2	11
Iowa	0	0	126	54	19	8	9	3
Missouri	1	0	85	28	80	2	5	7
North Dakota	1	0	21	34	9	1	0	0
South Dakota	0	0	26	5	27	7	0	0
Nebraska	0	0	39	9	12	15	0	0
Kansas	0	0	131	45	8	29	53	7
South Atlantic States:								
Delaware	0	0	3	4	0	0	1	0
Maryland [2] [3]	1	0	43	53	0	0	3	3
District of Columbia [3]	0	0	11	26	0	0	0	0
Virginia [3]	0	3	22	20	0	0	14	6

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 13, 1936, and June 15, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935	Week ended June 13, 1936	Week ended June 15, 1935
South Atlantic States—Continued.								
West Virginia	0	0	20	37	0	0	6	7
North Carolina	2	57	15	21	0	1	4	16
South Carolina [4]	0	0	1	1	0	0	8	32
Georgia [4]	0	0	9	5	0	0	18	40
Florida [4]	2	0	5	1	0	0	2	15
East South Central States:								
Kentucky [4]	0	0	11	13	0	0	9	9
Tennessee	0	0	15	8	0	0	12	17
Alabama [4]	1	2	5	5	0	0	4	23
Mississippi [2]	0	1	7	7	0	0	3	9
West South Central States:								
Arkansas	0	0	4	3	0	0	4	8
Louisiana	2	7	-------	5	1	0	13	16
Oklahoma [5]	0	0	21	4	0	1	10	3
Texas [4]	2	0	28	28	5	9	12	19
Mountain States:								
Montana [3]	0	0	49	8	12	7	1	0
Idaho [3]	0	1	5	9	0	0	2	0
Wyoming [3]	0	0	11	10	8	7	0	0
Colorado	0	0	49	126	0	2	0	0
New Mexico	0	0	44	6	0	0	6	0
Arizona	0	0	17	25	0	0	0	6
Utah [2]	0	0	24	75	3	0	0	0
Pacific States:								
Washington	0	0	43	36	2	29	2	2
Oregon [3]	0	0	29	15	16	2	2	2
California	2	20	261	155	0	10	10	10
Total	20	101	4,162	4,733	228	146	282	321
First 24 weeks of year	448	719	168,892	165,315	5,431	4,529	3,036	3,718

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended June 13, 1936, 20 cases, as follows: Maryland, 1; District of Columbia, 1; Virginia, 7; Montana, 4; Idaho, 2; Wyoming, 3; Oregon, 2.
[4] Typhus fever, week ended June 13, 1936, 20 cases as follows North Carolina, 1; South Carolina, 2; Georgia, 5; Florida, 1; Kentucky, 2; Alabama, 7; Texas, 2.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April 1936										
Colorado	4	12	1	-------	142	-------	0	531	34	7
May 1936										
Arizona	12	12	257	13	770	1	1	125	0	10
Indiana	24	33	123	-------	84	-------	2	525	8	6
Maine	1	10	15	-------	1,446	-------	0	68	0	7
Michigan	13	33	9	10	465	-------	5	1,259	2	18
Nebraska	3	8	5	-------	179	-------	0	486	82	0
New Jersey	15	46	21	6	2,190	-------	1	1,184	0	9
New Mexico	3	16	40	3	226	4	1	239	0	9
Ohio	35	77	137	5	2,241	-------	0	1,010	0	42
Pennsylvania	58	149	-------	2	5,343	2	6	1,877	0	40
South Carolina	-------	47	668	758	298	180	3	14	0	14
Wyoming	-------	3	-------	-------	6	-------	0	143	67	0

	Cases
April 1936	
Colorado:	
Chicken pox	235
Epidemic encephalitis	2
Impetigo contagiosa	6
Mumps	504
Septic sore throat	3
Vincent's infection	1
Whooping cough	156
May 1936	
Chickenpox:	
Arizona	123
Indiana	132
Maine	120
Michigan	1,353
Nebraska	240
New Jersey	991
New Mexico	70
Ohio	1,046
Pennsylvania	1,931
South Carolina	53
Wyoming	23
Dengue:	
South Carolina	4
Diarrhea:	
Ohio (under 2 years, enteritis included)	7
South Carolina	402
Dysentery:	
Arizona	35
New Jersey (amoebic)	1
New Mexico (bacillary)	4
Ohio (bacillary)	1
Epidemic encephalitis:	
Arizona	2
New Jersey	2
New Mexico	2
Pennsylvania	3
South Carolina	4
German measles:	
Arizona	97
Maine	490
Michigan	2,156

May 1936—Continued	
German measles—Contd.	Cases
New Jersey	1,164
New Mexico	10
Ohio	170
Pennsylvania	1,593
South Carolina	45
Hookworm disease:	
South Carolina	93
Lead poisoning:	
Ohio	18
Leprosy:	
Arizona	1
Mumps:	
Arizona	240
Indiana	314
Maine	707
Michigan	1,421
Nebraska	171
New Jersey	1,351
New Mexico	141
Ohio	877
Pennsylvania	2,104
South Carolina	282
Wyoming	82
Ophthalmia neonatorum:	
New Jersey	13
Ohio	71
Pensylvania	7
South Carolina	9
Paratyphoid fever:	
Michigan	1
South Carolina	1
Puerperal septicemia:	
Ohio	2
Rabies in animals:	
Indiana	68
Michigan	16
New Jersey	17
New Mexico	2
South Carolina	34
Rabies in man:	
Indiana	1
Rocky Mountain spotted fever:	
Wyoming	19

May 1936—Continued	
Septic sore throat:	Cases
Arizona	1
Maine	4
Michigan	28
New Mexico	5
Ohio	165
Wyoming	5
Tetanus:	
New Jersey	1
Ohio	2
South Carolina	3
Trachoma:	
Arizona	50
New Jersey	1
New Mexico	1
Pennsylvania	2
Trichinosis:	
Pennsylvania	1
Tularaemia:	
Michigan	1
New Jersey	1
Undulant fever:	
Arizona	6
Maine	1
Michigan	10
New Jersey	6
Ohio	3
Pennsylvania	8
Vincent's infection:	
Maine	9
Michigan	22
Whooping cough:	
Arizona	64
Indiana	109
Maine	200
Michigan	1,642
Nebraska	70
New Jersey	504
New Mexico	51
Ohio	1,072
Pennsylvania	1,076
South Carolina	66
Wyoming	10

PLAGUE INFECTION IN LASSEN, MODOC, AND VENTURA COUNTIES, CALIF.

The Director of Public Health of California has reported positive findings for plague in two squirrels from Lassen County, Calif. One squirrel, received at the laboratory on June 4, 1936, was from a ranch 4 miles east and 2 miles south of Adin, and the other, received at the laboratory on June 9, was found 3 miles west of Adin.

Plague infection was found in fleas taken from squirrels found on ranches in Fandango Valley, Modoc County; Modoc National Forest, 37 miles west and 13 miles north of Alturas; 2 ranches approximately 39 miles west and 16 miles north of Alturas; and 9 collections of squirrels in Ventura County. For a description of the method used in determining plague-infection in fleas taken from squirrels found in Modoc and Ventura counties, see p. 844.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 6, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	330	1	1	0	0	0	2	36
New Hampshire:											
Concord	0	------	0	0	1	1	0	1	0	0	10
Manchester	0	------	0	0	0	0	0	0	0	0	9
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:						4					
Barre	0	------	0	2	1	0	0	0	0	0	3
Burlington	0	------	0	68	0	0	0	0	0	8	14
Rutland	0	------	0	14	0	0	0	0	0	0	5
Massachusetts:											
Boston	2	------	1	310	14	67	0	9	0	32	233
Fall River	0	------	0	3	3	7	0	4	0	1	37
Springfield	0	------	0	1	0	6	0	1	0	0	31
Worcester	0	------	0	196	6	13	0	0	0	12	47
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	------
Providence	0	------	0	15	7	13	0	3	0	1	64
Connecticut:											
Bridgeport	0	2	1	5	2	0	0	2	0	0	39
Hartford	1	------	0	4	2	1	0	2	0	6	42
New Haven	0	------	1	0	1	1	0	1	0	22	43
New York:											
Buffalo	0	------	0	134	14	34	0	5	0	3	144
New York	31	3	1	1,377	98	278	0	95	2	77	1,461
Rochester	0	------	0	0	2	0	0	3	0	0	62
Syracuse	0	------	0	49	4	15	0	0	0	28	53
New Jersey:											
Camden	1	------	0	13	3	3	0	0	0	2	35
Newark	1	1	0	17	5	42	0	5	0	24	114
Trenton	0	------	0	4	1	3	0	1	0	18	42
Pennsylvania:											
Philadelphia	1	2	2	454	19	65	0	25	1	46	419
Pittsburgh	4	3	3	8	11	123	0	11	0	28	189
Reading	0	------	0	14	0	3	0	1	0	7	21
Scranton	0	------	------	0	------	1	0	------	0	0	------
Ohio:											
Cincinnati	4	------	0	15	7	9	0	12	0	0	127
Cleveland	1	1	1	166	11	48	0	14	0	100	197
Columbus	0	3	3	0	5	6	0	3	0	8	87
Toledo	1	------	0	41	4	5	0	5	2	20	70
Indiana:											
Anderson	0	------	0	0	0	15	0	0	0	4	9
Fort Wayne	0	------	0	0	4	6	0	0	0	0	31
Indianapolis	1	------	1	2	8	19	0	3	0	18	99
Muncie	0	------	0	0	1	0	0	0	0	0	10
South Bend	0	------	0	0	1	0	0	0	0	3	16
Terre Haute	0	------	0	0	0	0	0	0	0	0	24
Illinois:											
Alton	0	------	0	0	1	6	0	0	0	6	11
Chicago	25	2	2	11	38	165	0	51	1	103	659
Elgin	0	------	0	0	0	1	0	0	0	1	14
Moline	0	------	0	0	1	1	0	0	0	2	6
Springfield	1	------	0	0	0	3	0	0	0	4	3
Michigan:											
Detroit	2	1	0	23	17	206	0	11	2	303	282
Flint	0	------	0	1	7	3	0	0	1	3	26
Grand Rapids	0	------	0	1	3	8	0	1	0	5	32
Wisconsin:											
Kenosha	0	------	0	0	0	6	0	0	0	0	10
Madison	0	------	0	5	2	4	0	1	0	4	28
Milwaukee	0	------	0	8	4	72	0	3	0	65	114
Racine	0	------	0	0	0	18	0	0	1	4	11
Superior	0	------	0	0	2	14	0	0	0	0	16
Minnesota:											
Duluth	0	------	0	6	2	34	0	0	0	12	28
Minneapolis	2	------	2	193	5	74	0	2	0	16	107
St. Paul	0	------	0	38	5	17	0	1	0	3	56

City reports for week ended June 6, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa:											
Cedar Rapids	1	------	------	0	------	3	0	------	0	7	------
Davenport	0	------	------	0	------	6	0	------	0	0	------
Des Moines	1	------	------	1	------	8	1	------	0	0	33
Sioux City	0	------	------	2	------	16	13	------	0	0	------
Waterloo	0	------	------	0	------	12	0	------	0	0	------
Missouri:											
Kansas City	10	------	1	1	7	42	0	7	0	0	126
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	9	3	0	7	6	37	0	11	1	10	166
North Dakota:											
Fargo	0	------	0	0	1	3	0	0	0	0	9
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	5	0	7	0	0	0	0	3
South Dakota:											
Aberdeen	0	------	------	1	0	7	0	------	0	1	------
Nebraska:											
Omaha	7	------	0	9	7	19	13	0	0	1	54
Kansas:											
Lawrence	0	------	0	0	0	1	0	0	0	0	5
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	1	------	0	0	2	4	0	0	0	0	30
Delaware:											
Wilmington	0	------	0	5	2	0	0	0	0	1	23
Maryland:											
Baltimore	4	------	0	233	13	23	0	10	0	39	190
Cumberland	0	------	0	0	3	0	0	0	0	0	13
Frederick	0	------	0	0	0	0	0	0	0	0	2
District of Col.:											
Washington	10	------	0	100	14	12	0	9	0	24	182
Virginia:											
Lynchburg	1	------	0	1	2	1	0	1	0	6	10
Norfolk	0	1	0	1	1	0	0	2	0	0	36
Richmond	0	------	2	1	3	15	0	1	1	0	46
Roanoke	1	------	0	0	0	0	0	2	0	1	17
West Virginia:											
Charleston	0	1	1	1	2	1	0	1	2	0	46
Huntington	0	------	------	0	------	2	0	------	0	0	------
Wheeling	1	------	0	40	0	1	0	1	0	3	19
North Carolina:											
Gastonia	0	------	0	0	0	0	0	0	0	0	------
Raleigh	0	------	0	0	2	0	0	3	1	2	15
Wilmington	0	------	0	0	0	0	0	0	0	0	9
Winston-Salem	1	------	0	0	1	0	0	3	0	0	15
South Carolina:											
Charleston	0	5	0	0	1	2	0	2	0	2	23
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	0	0	0	0	0	0	8
Greenville	0	------	0	2	0	0	0	0	0	0	2
Georgia:											
Atlanta	3	2	0	0	4	13	0	0	0	2	74
Brunswick	0	------	0	0	0	0	0	0	0	0	4
Savannah	0	------	0	1	1	2	0	3	1	0	33
Florida:											
Miami	0	1	1	4	0	0	0	2	1	2	25
Tampa	0	------	0	4	1	0	0	1	2	7	16
Kentucky:											
Ashland	0	------	1	0	1	0	0	1	0	0	25
Covington	0	------	0	7	0	6	0	1	0	0	11
Lexington	1	1	0	5	0	1	0	2	0	2	25
Louisville	6	------	0	0	6	0	0	7	0	0	84
Tennessee:											
Knoxville	0	------	0	5	0	0	0	0	0	0	16
Memphis	1	------	0	0	8	2	0	9	0	29	80
Nashville	1	------	0	5	3	3	0	3	0	2	64
Alabama:											
Birmingham	0	1	0	0	4	0	0	5	2	2	68
Mobile	0	------	0	0	0	1	0	2	0	0	25
Montgomery	1	2	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	------	------	------	------	------	------	------	------	------	------	------
Little Rock	0	------	0	0	1	0	0	3	0	0	3
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	1	1
New Orleans	10	3	0	6	7	2	0	9	0	30	178
Shreveport	0	------	0	0	7	1	0	1	0	1	33
Oklahoma:											
Oklahoma City	1	------	1	2	3	4	0	1	0	2	38

City reports for week ended June 6, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	4	2	2	56	6	6	0	3	1	3	62
Fort Worth	0	------	0	0	2	1	0	1	2	0	26
Galveston	0	------	0	0	4	0	0	1	0	0	18
Houston	7	------	2	1	2	3	0	1	0	0	85
San Antonio	0	------	3	3	8	0	0	5	0	0	71
Montana:											
Billings	0	------	0	2	0	0	0	0	0	0	6
Great Falls	0	------	0	0	1	1	0	1	0	0	10
Helena	0	------	0	0	0	0	0	0	0	0	6
Missoula	0	------	0	0	2	3	0	0	0	0	11
Idaho:											
Boise	0	------	0	1	1	1	0	0	0	0	4
Colorado:											
Colorado Springs	0	------	0	0	0	6	0	2	0	0	10
Denver	4	------	2	27	3	12	0	2	0	20	82
Pueblo	0	------	0	1	2	11	0	0	0	2	11
New Mexico:											
Albuquerque	0	------	0	9	0	7	0	2	0	0	10
Utah:											
Salt Lake City	0	------	0	39	0	22	0	0	0	3	28
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	171	5	11	5	5	0	4	106
Spokane	0	------	0	13	1	15	0	0	1	8	37
Tacoma	0	------	0	40	4	6	0	0	0	1	28
Oregon:											
Portland	0	------	2	1	6	10	0	3	4	13	72
Salem	0	------	------	3	------	2	0	------	0	0	------
California:											
Los Angeles	11	13	0	130	12	25	0	17	1	80	270
Sacramento	1	------	0	3	1	18	0	6	1	35	32
San Francisco	0	------	0	118	11	77	0	8	0	5	187

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	1	4
Worcester	1	1	0
Connecticut:			
Bridgeport	1	0	0
New Haven	1	0	0
New York:			
New York	6	4	1
New Jersey:			
Newark	2	0	0
Pennsylvania:			
Philadelphia	2	0	1
Pittsburgh	1	1	0
Reading	1	0	0
Ohio:			
Cincinnati	4	0	0
Indiana:			
Indianapolis	2	1	0
Illinois:			
Chicago	6	3	1
Wisconsin:			
Racine	0	1	0
Minnesota:			
Minneapolis	1	0	0
Iowa:			
Cedar Rapids	1	0	0
Missouri:			
Kansas City	0	1	0
St. Louis	4	0	0
Maryland:			
Baltimore	1	1	0
District of Columbia:			
Washington	2	1	0
South Carolina			
Charleston	1	1	0
Georgia:			
Atlanta	1	0	0
Florida:			
Miami	0	1	0
Kentucky:			
Louisville	0	3	0
Tennessee:			
Nashville	1	0	0
Alabama:			
Birmingham	1	1	0
Louisiana:			
New Orleans	3	3	0
Colorado:			
Denver	0	0	1
California:			
Sacramento	0	0	1

Epidemic encephalitis.—Cases: San Francisco, 1.

Pellagra.—Cases: Chicago, 1; Wilmington, N. C., 1; Winston-Salem, 5; Charleston, S. C., 3; Brunswick, 1; Savannah, 13.

Typhus fever.—Cases: Charleston, S. C., 1; Atlanta, 1; Savannah, 1. Deaths.—Charleston, S. C., 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended May 30, 1936.—During the 2 weeks ended May 30, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				2	1	1		1	1	6
Chicken pox		12		203	424	35	24	21	103	822
Diphtheria		11		30	11	3	3			58
Dysentery				1						1
Erysipelas				12	9			9	3	33
Influenza		12	3		47	6	15		11	94
Lethargic encephalitis					2					2
Measles	1	43	28	623	2,250	213	199	388	684	4,429
Mumps		10			742	36	29	44	158	1,019
Paratyphoid fever					2		2	1	1	6
Pneumonia	1	2			37		1		13	54
Poliomyelitis					1					1
Scarlet fever	2	16	6	115	282	103	16	103	45	688
Trachoma						1	2		4	7
Tuberculosis	12	51	13	136	86	8	21	5	67	399
Typhoid fever			2	20	3	2	1	2	2	32
Undulant fever				1	1	1	1			4
Whooping cough	10	19	7	49	276	18	16	34	65	494

CUBA

Habana—Communicable diseases—4 weeks ended June 6, 1936.—During the 4 weeks ended June 6, 1936, cases of certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Disease	Cases
Diphtheria	11	Scarlet fever	1
Malaria	[1] 37	Tuberculosis	40
Poliomyelitis	[1] 2	Typhoid fever	[1] 49

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended May 30, 1936.—During the 4 weeks ended May 30, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1			11	3	1	16
Chicken pox		19		11	2	2	34
Diphtheria	1		2	3	2	5	13
Hookworm disease		1		1			2
Leprosy				2		1	3
Malaria	162	34	13	201	97	600	1,107
Measles	34			3	8		45
Poliomyelitis	1	2		1	1	3	8
Scarlet fever						1	1
Tuberculosis	16	8	13	39	15	34	125
Typhoid fever	16	66	21	27	12	91	233

CZECHOSLOVAKIA

Communicable diseases—March 1936.—During the month of March 1936, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	2		Paratyphoid fever	5	1
Cerebrospinal meningitis	14	4	Poliomyelitis	8	
Chicken pox	214		Puerperal fever	52	17
Diphtheria	2,103	152	Scarlet fever	2,353	71
Dysentery	6	1	Trachoma	74	
Influenza	1,524	24	Typhoid fever	268	32
Lethargic encephalitis	2	1	Typhus fever	210	8
Malaria	50				

GERMANY

Vital statistics—1935.—Following are the vital statistics for Germany for the year 1935:

Number of marriages	650,851
Number of live births	1,261,273
Live births per 1,000 population	18.9
Number of stillbirths	32,763
Number of deaths	791,912
Deaths per 1,000 population	11.8
Deaths under 1 year of age	86,227
Deaths under 1 year of age per 100 live births	6.8

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Week ended—												
						March 1936				April 1936				May 1936				
						7	14	21	28	4	11	18	25	2	9	16	23	30
Ceylon:																		
Batticaloa.[1]																		
Provinces	C										14	4						
India	C	25,638	11,615	14,233	13,729	2,995	3,799	4,206	5,605	6,413	5,717	6,008	5,890					
	D	13,350	6,169	7,799	7,183	1,449	1,792	2,064	2,683	2,930	2,855	2,978	2,982					
Assam	C	658	707	318	92	8	12	8	31	20	19	45	53	75	124	115	98	
	D	356	396	167	46	4	7	5	14	12	4	22	27	37	51	65	49	
Bassein	C															3		
Bombay Presidency	C	1,892	941	459	332	16	41	35	38	40	36	32	37	63	87			
	D	877	445	237	149	9	15	21	10	14	13	10	5	25	27			
Bombay	C	[2] 1																
Calcutta	C	144	103	140	380	227	188	179	208	245	171	230	153	161	192	268	225	
Central Provinces and Berar	C	1,350	98	14	56	26	45	52	94	122	102	49	84	38	23	163	184	
Chittagong	C	1												4	1			1
Madras Presidency	C	5,280	2,855	3,870	2,877	902	861	598	390	442		404	368					
	D	2,527	1,336	2,013	1,407	429	421	281	209	189		192	151					
Madras	C	12	13	9	70	5	4	12	5	1	2	1	1		1	1		
	D	4	7	3	26	3	3	5				1						
Moulmein	C				2	5	1	1	3	1		1		1		2		
Negapatam	C		7	22	56	2		4		1	1							
	D		4	8	27	2												
Northwest Frontier Province	C			1	1													
Punjab	C	24	7	1							1	1	4	3	5		3	
Rangoon	C	[2] 1		[2] 1							4							
India (French):																		
Chandernagor	C			8	6						2	3	1	1				
Karikal	C	12																
Pondichery	C	5																
Indochina (see also table below):																		
Bentre	C														1			
Pnom-Penh	C														1			
Siam:																		
Ang Thoang Province	C	3			3	4	1	1		5	1	3	2					
	D	3			3	3	1			2	1	2	1					
Ayudhaya Province	C	25	40	74	214	40	14	23	24	1	5	7	12	3	13	4		
	D	16	35	49	150	25	9	18	17	4	4	9	6	4	11	2		

Bangkok	C	77	49	124	375	48	52	30	18	18	11	17	13	20	8	11	8	10
Bejrpuri Province	C	3		56	66	4	3	10	25	14	18	6	4	7	1			
Bichitr Province	C					P	6	11	3	23	11							
Bisnulok Province	C				13	14	35	25	32	14	4	49	6	40	20	4		
Chandapuri Province	C								15		4							
Chhaxoengsao Province	C		55	175	95	5	2	2	12	4	1	1	1	2		2		
Jalapuri Province	C		3	20	12		1	7	1	5			4	20	8	6		
Jayanad Province	C				13	1	4	2	4			6	13					
Kanchanapuri Province	C							2	9	8	1	11	7					
Lobpuri Province	C		10		7	2										1		
Nagara Nayok Province	C				10													
Nagara Pathom Province	C	25	1	4	11	1	6	17	19	6	17	3	1	2	2			
Nagara Rajsima Province	C				2													
Nagara Svarga Province	C				15	1	1	23	17	24	3	28	10	9	4	3		
Nondpuri Province	C	19	3	7	21	16	2	2	3	3	2	4	2	10	1			
Prachinpuri Province	C	14	54	26	4		3			1								
Prachuabgirikhand Province	C										14							
Pradhumdhani Province	C	2	1	4	41	18	3				1		4	13	8	5		
Prae Province	C							3										
Rajpuri Province	C	36	54	63	16	6	7	14	16	13	14	17	26	13		3		
Sarapuri Province	C	17		2	104	7	1	1										
Singhapuri Province	C	15	2	1	1							9	7	6		1		
Smudprakar Province	C	6	49	15	156	20	45	46	27	5	30	9	2	6	14	9		
Smudsagara Province	C	7	36	58	76	30	19	23	8	10	5		6	6		5		
Smudsongram Province	C	34	38	49	84	20	36	32	24	27	10	13	9	4				
Subarnpuri Province	C	18			13	4	24	4	16	14	12	11	9	2	7			
Upala Rajdhani Province	C					P	33	2						1		4		
Uttradhani Province	C								12									
Utradith Province	C						3	2		3	10	4		1	4			
On vessels:																		
S. S. *Egra* at Rangoon	C			1														
S. S. *Floristan* at Masulipatam	C			[2] 1														
S. S. *Chatala* at Rangoon from Chittagong	C								1									
S. S. *Kuisang* at Penang from Calcutta	C										1							
S. S. *Karagola* at Penang from Calcutta	C														1			

Place		December 1935			January 1936			February 1936			March 1936			April 1936		
		1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-29	1-10	11-20	21-31	1-10	11-20	21-30
Indochina (French) (see also table above):																
Cambodia [4]	C				1		1	4	7		4	4	3		2	
	D				1		1	3	1		4	3	3		1	
Cochinchina [4]	C		2	1			2	2		3	3	4	1	4		1
	D		2	1			2	2		3	3	4	1	3		1

[1] According to information dated Apr. 8, 1936, 31 cases of cholera with 27 deaths have occurred in the vicinity of Batticaloa, Ceylon.
[2] Imported.
[3] Suspected.
[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Week ended— March 1936: 7	14	21	28	April 1936: 4	11	18	25	May 1936: 2	9	16	23	30
Algeria: Bone	C									[2] 3								
Argentina (see also table below):																		
Bahia Blanca (vicinity of)	C				2													
	D				2													
Azores. (See table below.)																		
Basutoland	C				[3] 2													
Belgian Congo	C															1		
Brazil (see also table below).																		
British East Africa:																		
Kenya	C	7	25	10	22		2	2	5	7	3		1	8	2	21		
Tanganyika	C			7	2	5								3				
Uganda	C	281	61	44	44	14	14	18	16	9	8	16	24	23	17	43		
	D	231	54	40	42	13	14	15	16	9	8	15	23	22	16	42		
Ceylon:																		
Anuradhapura	C							1										
Balapitiya	C	1																
Colombo	C	5	11	10	6	1			2	1	1	1		2				1
	D	4	10	9	3	1			2	1	1	1		2				1
Plague-infected rats		27	4		2	2	1			2		1	5	2				5
Hatton	C															3		
Manar	C											1						
Weligama	C										1							
China: Manchuria.[4]																		
Dutch East Indies: West Java	C	985	878	726	996	18[illegible]	162	186	164									
	D	980	873	723	990	185	158	183	162									
Ecuador:																		
Daule[5]	C							1										
Guayaquil	C	48	20	8	6		1			1								
	D	16	4	6	3					1								
Plague-infected rats		12	5	2		1												

Egypt:																		
Alexandria: Plague-infected rats		P	P	P	P	P		P		P		P		P		P		
Asyut Province	C	1	3	6	9	1	1	4	7	4	5	7	2	1	1			
Girga Province	C			1	2				1	1							1	
Minya Province	C				4		1	4					1	1				
Great Britain—England—Liverpool: Plague-infected rats			2															
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district:																		
Hamakua Mill		1	1		1													
Kukaiau		2	1															
Paauhau				1										2				
Pohakea Sector					1					1	1	2						
India	C	3,131	1,852	2,168	3,382	591	1,168	1,061	723	602	721	447	564					
	D	1,019	928	1,144	1,726	367	483	426	393	279	357	279	310					
Bassein	C		1		7	1	2	1		3		1	1		1	2	1	
Plague-infected rats		1			2													
Bombay Presidency	C	148	88	99	169	17	36	47	25	9	21	21	17	7	4			
	D	93	48	61	110	8	23	24	15	6	12	15	14	3	2			
Bombay	C			[2]1														
Central Provinces and Berar	C	1,651	716	194	584			345	111	181	135	79	92	45	6	1		
Karachi	C						5											
Madras Presidency	C	133	71	42	29	16	11	4	13	10		5	5					
	D	88	51	26	11	14	8	6	10	5		5	3					
Punjab	C	48			1	7	2	3	2	8	22	54	11	56	1	8		
	D	21				3	2		2	4	16	28	5	36	1	7		
Rangoon	C		[6]1		[6]1										3		2	
Plague-infected rats			1		5		2										1	
Indochina (see also table below):																		
Pnom-Penh	C			1	1										1			
Saigon-Cholon	C			1									1					
Tanghai	C										2						4	
Iraq: Baghdad	C	1	1	[6]1														
Madagascar. (See table below.)																		
Malta	C											3		1				
	D											2						
Peru. (See table below.)																		
Senegal. (See table below.)																		
Tunisia: Tunis	C	1																
	D	1																
Plague-infected rats		1			2					1	1							
Union of South Africa	C	7	7	44	144		[7]22		[7]19		[7]6				[7]3		[7]3	
Cape Province	C		2															
Orange Free State	C	1	1															

[1] Including plague in the United States and its possessions.
[2] Includes 1 suspected case.
[4] A report dated Oct. 28, 1935, states that up to Oct. 23, 155 deaths from plague were reported in the provinces of Kirin, Lungkiang, Fengtien, and South Hsingan, Manchuria, China. A report dated Nov. 27, 1935, stated that 23 deaths from plague had occurred in the vicinity of Koshan, and that there were about 15 cases in Harbin.
[5] During the period Jan. 1 to Feb. 20, 1936, 7 cases of plague were reported at Daule and vicinity, Ecuador.
[6] Imported.
[7] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Week ended— March 1936: 7	14	21	28	April 1936: 4	11	18	25	May 1936: 2	9	16	23	30
United States:																		
California:																		
Lassen County.[8]																		
Modoc County.[9]																		
Santa Rosa	C											1						
Ventura County: Plague-infected squirrel[9]										1								
Nevada: Elko County.—Plague-infected squirrels															P			

Place		November 1935	December 1935	January 1936	February 1936	March 1936	April 1936
Argentina (see also table above):							
Buenos Aires Province	C				2		
Cordoba Province	C		5	1			
San Luis Province	C						6
Santa Fe	C			1			
Azores	C	2	2	3	4		
Basutoland	C		16				
Brazil:							
Bahia State	C	7	20				
Ceara State	C				7	54	
Pernambuco State	C					[10] 15	
Indochina (see also table above):							
Cambodia	C			1	2	1	1
Cochinchina	C	1		1			1
Madagascar (central region)	C	345	507	503	382	206	
	D	333	485	485	358	196	
Peru	C	14	9	23	19	10	15
Arequipa Department	C			5			
Catamarca Department	C	13					
Lambayeque Department	C		1	4	3		
Libertad Department	C	1		5	1	1	6
Lima Department	C	10	7	9	8	3	6
Callao	C			1	2	4	1
	D			1	2	1	1
Plague-infected rats						P	
Piura Department	C				5		2
Trujillo Department	C					2	
Senegal							
Dakar[11]	C			1	1		
	D			1	1		
Tivaouane[11]	C	1	1				1

[8] Plague-infected squirrels have been reported in Lassen County, Calif., as follows: Week ended June 6, 1936, 1 plague-infected squirrel, and week ended June 13, 1936, 1 plague-infected squirrel.
[9] During the week ended June 6, 1936, plague-infected squirrels were reported present in Modoc County and Ventura County, Calif.
[10] From Jan. 1 to Mar. 16, 1936.
[11] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Week ended— March 1936: 7	14	21	28	April 1936: 4	11	18	25	May 1936: 2	9	16	23	30
Algeria:																		
Algiers Department	C				2													
Constantine Department	C											1						
Argentina (see also table below):																		
Corrientes Province	C								5									
Jujuy Province	C								7									
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil: Porto Alegre (alastrim)	C	32	27															
British East Africa:																		
Tanganyika	C	18		9	8			38	19						11	61		
Uganda	C			10	12	4	2	1										
British Somaliland	C	3	7	4	34											6		
British South Africa: Southern Rhodesia	C				1													
Canada:																		
Alberta	C	[1] 1		[1] 1	3	4	18	5	3	1				1	1			
British Columbia	C	[1] 1	2	2		[1] 1												
Ontario	C									[1] 1								
Saskatchewan	C	[1] 1																
Ceylon: Colombo	C			1														
China:																		
Amoy	C				3							1						
Canton	C									1								
Dairen	C				4			1	1	1		1						
Foochow	C	P	P	P	P	P		P				P		P				
Hangchow	C		1	3	15	5		1	2	2	1		2	2				
Hankow	C				4			1				2			1			
Hong Kong	C	2				2	1	2	1	4	2	1		1	1			3
Nanking	C	26	43	16	41	4	6	14	14	21	9	10	39	27				
Shanghai	C	4	6	5	30	7	6	7	3	15	9	17	9	11	9	10	9	10
Swatow	C	3	1		2	1				2	2							
Tientsin	C		3			2					1							
Chosen. (See table below.)																		
Colombia (see also table below)	C	44	32	68	13		[2] 78		10			[2] 30						
Bogota	C	8	3															

[1] For 2 weeks.
[2] For 3 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Week ended— March 1936 7	14	21	28	April 1936 4	11	18	25	May 1936 2	9	16	23	30
Dahomey. (See table below.)																		
Dutch East Indies: Palembang	C					1												
Ecuador. (See table below.)																		
Egypt: Provinces	C				2	5												
Eritrea	C				1			5				2						
Asmara	C											1						
France. (See table below.)																		
Great Britain: England and Wales—London and Great Towns	C													3		1		
Greece: Salonika	C	4		6	14	5	5	5	5	5	5	5	5	5	8	8		
Guatemala. (See table below.)																		
India	C	8,642	9,617	19,883	34,355	6,407	7,841	8,353	8,711	8,327	9,390	8,385	8,646					
	D	1,762	2,106	4,220	8,417	1,585	1,818	2,068	2,208	2,215	2,548	2,244	2,084					
Assam	C	17	168	116	798	85	84	64	88	57	60	32	70	36	112	35	34	
Bassein	C			[3] 1														
Bombay Presidency	C	635	741	1,703	3,444	730	627	754	709	741	826	570	722	773	592			
	D	90	103	282	650	158	139	134	125	104	167	137	152	124	111			
Bombay	C	21	30	86	266	54	64	78	81	87	104	74	57	63	45	43	47	
	D	12	21	49	149	34	37	43	43	46	65	45	30	40	31	24	38	
Calcutta	C	19	88	270	1,606	330	464		511	563	383	288	318	200	126	100	77	
	D	12	56	133	893	272	312		361	425	310	217	214	158	103	86	67	
Central Provinces and Berar	C	475	808	1,266	2,652	479	549	541	540	461	913	561	891	661	563	665	585	
Chittagong	D			1	1								1					
Cochin	C	1			21	2		5										
Karachi	C	3	11	17	77	12	5	6	5	13	7	11	5	6	5	3	1	
Madras Presidency	C	1,811	1,366	1,312	1,214	458	555	439	528	316		322	302					
	D	324	269	176	191	75	85	56	78	56		68	41					
Madras	C	7	5	3	3		4	7	1			1		1			3	
Moulmein	C	2	6	27	61	26	22	20	15	12	9	7	7	2	9	7	11	
Negapatam	C			3	2					1	2				1			
Northwest Frontier Province	C	9	7	26	50		1			3		16	2		5			
Punjab	C	336	313	498	641	92	140	100	105	53	83	135	101	97	47	70		
Rangoon	C	[3] 1	4	9	10	2	7	5	2	8	5	3	4				3	
Sind State	C										21	43	26	71	54	45	26	
Tuticorin	C	3	5															
Vizagapatam	C	6	9	36	39	1	2	11	5		1	1			3		1	

India (French):																		
Chandernagor	C	44																
Karikal	C	1																
Pondichery	C	3																
	D	3		7														
India (Portuguese)	C			1		5		4										
Indochina (see also table below):																		
Haiphong	C				1													
Tourane	C							1					1	1				
Iran	C	3	12	9	12		1											
Iraq	C	8	36	58	40	5	1	1	2	2	4	2	2	1	4		1	5
Baghdad	C	2		1						1			1	1				
Basra	C	1										2	1					
Italian Somaliland	C	2																
Japan:																		
Kobe	C									1								
Moji	C				1	1												
Nagasaki	C											1						
Osaka	C							5				1						1
Yamaguchi Prefecture	C			1														
Libya: Tripolitania	C			2														
Mexico (see also table below):																		
Chihuahua	C	1		1	1					2				2				
Guadalajara	D	9	16	13	46	14	13	6	6	9	13	8	3		4	5	8	4
Mazatlan	C	1			1	1	1											
Mexico, D. F.	C	12	5	4	11	3	3	5	1									
Monterrey	C	1			2	2							1					
San Luis Potosi	D						1											
Torreon	C	5	1	1			1		1									
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	146	427	84	549	798			[2] 809		[1] 162							
Lagos	C				2													
Niger Territory. (See table below.)																		
Nyasaland. (See table below.)																		
Oman: Sharjah and Pirate Coast	C			875	70				[4] 46									
Peru. (See table below.)																		
Poland	C	1			1													
Portugal (see also table below): Lisbon	C	5	8	3	5	1		1	3		1	1	1			1		
Portuguese East Africa. (See table below.)																		
Salvador. (See table below.)																		
Saudi Arabia	C	4			8							10						
Sierra Leone	C	222	116	37	235		[1] 211		[1] 4		[1] 3							
Freetown	C		2		1						[1] 1							
Spain	C	1	1	20	12	1	2	5	7	10		2	2	3	3			
Sudan (Anglo-Egyptian)	C	2		3	5	12				2		1	3	13	2	2		1
Turkey. (See table below.)																		
Uruguay. (See table below.)																		

[1] For 2 weeks. [2] For 3 weeks. [3] Imported. [4] For 5 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

On vessels:		
S. S. *Ekma* at Rangoon from Calcutta	1 case	Dec. 10, 1935
S. S. *Cape St. Francis* at Rangoon from Calcutta	1 case	Dec. 17, 1935
S. S. *Bankura* at Karachi	1 case	Jan. 4, 1936
S. S. *Jalgopal* at Rangoon from Aracan	1 case	Jan. 5, 1936
S. S. *Matua* at Suez from Calcutta	1 case	Jan. 21, 1936
S. S. *Khosrou* at Kamaran quarantine station	1 case	Feb. 15, 1936
S. S. *Karapara* at Rangoon from Calcutta	1 case	Mar. 9, 1936
S. S. *Eyre* at Calcutta	1 case	Mar. 10, 1936
S. S. *City of Auckland* at Rangoon from Calcutta	2 cases	Mar. 15, 1936
On vessels—Continued.		
S. S. *Khandalla* at Rangoon from Calcutta	1 case	Mar. 16, 1936
S. S. *Haisháng* at Rangoon	1 case	Mar. 18, 1936
S. S. *Cranfield* at Madras from Calcutta	1 case	Mar. 27, 1936
S. S. *Hokuryo Maru* at Moji from Tientsin	1 case	Apr. 2, 1936
S. S. *City of Adelaide* at Colachel from Rangoon	1 case	Apr. 13, 1936
S. S. *City of London* at Suez from Calcutta	1 case	Apr. 20, 1936
S. S. *Manipura* at Port Sudan from Calcutta	1 case	Apr. 23, 1936
S. S. *Kasagi Maru* at Moji from Shanghai	1 case	May 4, 1936
S. S. *Awaji Maru* at Nagasaki from Dairen	1 case	May 8, 1936

Place		November 1935	December 1935	January 1936	February 1936	March 1936	April 1936
Argentina:							
Buenos Aires Province	C				4	7	
Entre Rios Province	C				5	1	
Jujuy Province	C					7	3
Belgian Congo	C		54	456	227	198	
Bolivia	C	38	43	48	18	62	18
China: Manchuria—Harbin	C		1	1	3		
Chosen	C	53	53	86			
Colombia:							
Barranquilla	D				1	1	
Santa Marta	D				1		
Dahomey	C	31	11		18		
Ecuador: Guayaquil	C				1		
France	C	7	18	76	24	30	
Guatemala	C	1		2	14	2	5
Indochina (see also table above)	C	66	44	57	229	196	221
	D	10	3	3	31	15	30
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C				5	4	
Chiapas State	C			1			
Chihuahua State—Chihuahua	C					1	
Coahuila State—Torreon	C				1		
Colima State	C				1	1	
Guanajuato State	C			5		5	
Leon	C			1			
Jalisco State	C			109			
	D			28			
Mexico (see also table above)—Continued.							
Guadalajara	C			85	115	70	
	D			24	50	43	
Lower California	C				7		
Mexico State	C				2	4	
Mexico, D. F.	C			10	22	18	
Mexico City	C			9			
Morelos State	C					1	
Puebla State	C			2	9	2	
Puebla	C				8	2	
Quintana Roo	C					1	
San Luis Potosi State—San Luis Potosi	C					8	
Sonora State	C				1	1	
Tamaulipas State	C			8			
Tlaxcala State	D					1	
Morocco	C			9	1	2	15
Mozambique	C	1		3	1	2	6
Niger Territory	C		43				
Nyasaland	C	19		3	50	1	
Peru	C	7		21	7		
Portugal (see also table above)	C	103	74	108			
	D	26	11	6			
Portuguese East Africa	C			3			
Salvador	C	36	12	32	46	13	30
Turkey	C			5	6	1	1
Uruguay	C			3			

TYPHUS FEVER

Place		Oct. 27–Nov. 30, 1935	Dec 1–28, 1935	Dec. 29, 1935–Jan 25, 1936	Week ended— February 1936 1	8	15	22	29	March 1936 7	14	21	28	April 1936 4	11	18	25	May 1936 2	9	16
Algeria:																					
Algiers Department	C	1		4	3	6		15	7	7		53	4	31	28	15	5	21	11	38
Algiers	C			1																2
Constantine Department	C	1		25	5	24	10	10	11		10	24	15	22	16	6	18	5	24	8
Bone	C			1															1	
Constantine	C			3							1								2	
Oran Department	C			7			50	2	1		12			4	12	1	15		5	7
Australia: Sydney	C	2		1																
Basutoland	C											[1] 3								
Bolivia. (See table below.)																				
Bulgaria	C			14	5	6								16	14		17			
Chile	C	691							[2] 430											
Santiago Province [3]	C																			
Valparaiso	C	56	37	12	6	8	5	6	4	2	1	2	3	1	4	6	1			
China:																				
Canton	C	2																		
Hankow	C	1											1		1		2			
Nanking	C	1													1					
Shanghai	C		3															1		
South Manchuria Railway Zone	C	4																		
Tientsin	C	1						1		1						1				
Tsingtao	C		3			1							1							
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C		1	1						2	3	1	2			1				1
Asyut Province	C	1				5	2				1		1	1						2
Beheira Province	C	11	12	28	14	16	52			33	31		30	40						28
Cairo	C			1	3	3		3	2			1		3		2	1	5	1	
Dakahliya Province	C			1		10	25			4	3		7	6						15
Faiyum Province	C	1																		
Gharbiya Province	C	1		46	26	36	16			49	37		45	33						32
Girga Province	C	1		1										1						
Minufiya Province	C					26	4			9	2		7							2
Port Said	C																			1
Qena Province	C	1				2	1			1			24	20						1
Sharkiya Province	C			1	1					1	11		1							2

[1] For 3 weeks.

[2] For 5 weeks.

[3] A report dated Jan. 29, 1936, states that there were 305 cases of typhus fever with 58 deaths in Santiago Province, Chile, from Nov. 2–16, 1935.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Week ended— February 1936 1	8	15	22	29	March 1936 7	14	21	28	April 1936 4	11	18	25	May 1936 2	9	16
Egypt—Continued.																				
Suez	C	1																		
Provinces	C	26	41	138	44		103	126	98	86	153	133		119	159	153	132	109	107	106
Finland. (See table below.)																				
Greece (see also table below): Salonika	C	1	4	3	1	2	2	2	2	6	6	6	6	1	1	1	1	1	1	1
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C	1	1								1	4	2						1	
Hungary	C			3								7		2	2			1		
Iran	C	7	2	17	3			4	2		3	2	4	7	8	7	3	5	6	
Teheran	C			1						1	1	1	1	2	2	6	1			
Iraq	C		17	19																
Irish Free State: Mayo County	C														2			1		
Japan	C			1																
Lithuania	C	19		69		9				6			[1] 7		[1] 8		[1] 2			4
Mexico (see also table below):																				
Mexico, D. F	C	60	68	35	12	14	21		[2] 24	9	9	9	15							
San Luis Potosi	D								1											
Morocco (see also table below)	C	8	12	39	7	11	1	9	9			3	2	4	1	29	5	5	18	4
Palestine: Haifa	C	11		3		1	1							1						
Panama Canal Zone. (See table below.)																				
Peru. (See table below.)																				
Poland	C	159	230	382	101	153	121	150	146	126	153	144	196	134	129	113	142	148	159	194
	D	8	22	24	16	7	6	11	8	6	6	16	11	2	11	9	7	8	11	7
Portugal (see also table below): Oporto	C										1									
Rumania. (See table below.)																				
Straits Settlements: Singapore	C	1	2	3							1	1				1				
Syria: Beirut	C							[4] 2												
Trans-Jordan	C			6	5	4	1		1	2			4	5	5					

Tunisia:																				
Tunis	C	1	1	5							3	1	5	1	1	1	1	1	1	
Provinces	C	6	31	61	20	4	9	22	9	14	30	45	40	14	27	26	30	27	15	30
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				

Place		November 1935	December 1935	January 1936	February 1936	March 1936	April 1936
Bolivia	C	134	168	135	115	110	75
China: Manchuria—Harbin	C	3		1	5	9	
Chosen	C	30	50	51			
Czechoslovakia	C			14	25	219	13
Finland	C					5	112
Greece	C	4	9	5	7	6	
Guatemala	C	26	7	9	17	6	114
Latvia	C					5	
Mexico							
Aguascalientes State: Aguascalientes	C				5	5	
Durango State	C				1	1	
Guanajuato State	C			15		56	
Leon	C			7	16	20	
Mexico State	C				2	15	
	D				3		
Mexico, D. F.	C			86	73	52	
Mexico City	C			75			
	D			22			
Oaxaca State	C			1	2		

Place		November 1935	December 1935	January 1936	February 1936	March 1936	April 1936 [4]
Mexico—Continued.							
Puebla State	C			1			
Puebla	C				2	3	
Queretaro State	C			3			
San Luis Potosi State. San Luis Potosi	C			8	6	6	
Tlaxcala State	C					1	
Morocco (see also table above)	C		13	45	30	7	45
Panama Canal Zone	C	1	1	2	1	1	
Peru	C			143	103		
Portugal (see also table above)	C			1	1		
Rumania	C	92	210	572	905	1,581	
Turkey	C	18	35	33	51	33	79
Istanbul	C			5	4	4	
Union of South Africa.							
Cape Province	C	79	76	36	57	39	
Natal	C	6	1	7	2	3	
Orange Free State	C	18	4	17	21	5	
Transvaal	C	25	12	1	13	3	
Yugoslavia	C	10		131	80	113	105

[1] For 2 weeks.
[4] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Oct. 27–Nov. 30, 1935	Dec. 1–28, 1935	Dec 29, 1935–Jan 25, 1936	Week ended— February 1936 1	8	15	22	29	March 1936 7	14	21	28	April 1936 4	11	18	25	May 1936 2	9	16
Bolivia: Santa Cruz Department.[1]																				
Brazil:[2]																				
Bahia State	C		1	2																
Matto Grosso State	C		1	1	1				1	1					1					
Minas Geraes State	C		10	8	2	3	4		2	1		4	2		1	1		1		
	D		5	8	2	3	4		2	1		4	2		1	1		1		
Parana State[2]	C						1	4	4	1	7	5	6	1	2					
Sao Paulo State[3]	C		11	4		2	2	3	16	17	5	7	6	[3]3				1	1	6
Colombia:																				
Boyaca Department	C							3												
Intendencia of Meta	C							3												
Acacias	C	2																		
Restrepo	C	2																		
Gold Coast:																				
Koforidua	C															1				
Kumasi	C								1				1							
Prapraso	C														1					
Ivory Coast:																				
Abidjan	C	1																		
Sassandra	C	1																		
Vavua	C													1						
Niger Territory: Fada N'Gourma	C															1				
Senegal:																				
Bakel	C		[4]1																	
M'Baké	C		1																	
Tivaouane[5]																				
Sudan (French): Kouticala	C	1																		

[1] Yellow fever has been reported in Bolivia as follows: For the month of February 1936, 2 cases; March, 10 cases, April, 1 case.

[2] Yellow fever has also been reported in Brazil as follows Parana State, Feb. 16–25, 1936, 5 cases, 4 deaths; Sao Paulo State, no date given, 3 cases and 4 deaths; Mar. [illegible] 2 deaths.

[3] Includes 1 case of yellow fever reported in the city of Sao Paulo, Brazil.

[4] Suspected

[5] During the week ended June 6, 1936, 3 cases of yellow fever, 2 cases of which were suspected cases, were reported at Tivaouane, Senegal.